

BEFORE SUBMITTING YOUR BID

- 1. Use pen and ink to complete the Bid.**
- 2. Have you signed and completed the Contract Agreement, Offer & Award Forms?**
- 3. As a minimum, the Bidder will submit a Bid Package consisting of the Notice to Contractors, the completed Acknowledgement of Bid Amendments & Submission of Bid Bond Validation Number form, the completed Schedule of Items, 2 copies of the completed Agreement, Offer, & Award form, a Bid Bond or Bid Guarantee, and any other Certifications or Bid Requirements listed in the Bid Book.**
- 4. Have you included prices for all Bid Items? (“Zero is not considered a bid price.”)**
- 5. Have you included a bid guarantee? Acceptable forms are:**
 - A. Bid Bond on the Department’s prescribed form for 5% of the Bid Amount. (Or forms that do not contain any significant variations from the Department’s forms as solely determined by the Department.)**
 - B. Official Bank Check, Cashier’s Check, Certified Check, U.S. Postal Money Order or Negotiable Certificate of Deposit in the amount stated in the Notice to Contractors.**
- 6. If the written Bid is to be sent, Federal Express overnight delivery is suggested as the package is delivered directly to the DOT Headquarters Building in Winthrop. Other means, such as U.S. Postal Services’ Express Mail has proven not to be reliable.**

AND FOR FEDERAL AID PROJECTS

- 7. Have you included your DBE Utilization commitment in the proper amounts and signed the DBE Certification?**

If you need further information regarding Bid preparation, call the DOT Contracts Section at (207)624-3430.

For complete specifications regarding bidding requirements, refer to Section 102 of the Maine Department of Transportation, Standard Specifications, Revision December 2002.

NOTICE

The Maine Department of Transportation is attempting to improve the way Bid Amendments/Addendums are handled, and allow for an electronic downloading of bid packages from our website, while continuing to maintain a planholders list.

Prospective bidders, subcontractors or suppliers who wish to download a copy of the bid package and receive a courtesy notification of project specific bid amendments, must provide an email address to Diane Barnes at the MDOT Contracts mailbox at: MDOT.contracts@maine.gov. Each bid package will require a separate request. Please provide us an email address, so we can maintain the planholders list that both the industry and MDOT uses.

Additionally, the new Acknowledgement of Bid Amendment form will be placed in MDOT bid packages beginning with the 2/12/03 advertisements. After that date, interested parties will be responsible for reviewing and retrieving the Bid Amendments from our web site, and acknowledging receipt and incorporating those Bid Amendments in their bids.

The downloading of bid packages from the MDOT website is not the same as providing an electronic bid to the Department. Electronic bids must be submitted via <http://www.BIDX.com>. For information on electronic bidding contact Rebecca Pooler at rebecca.pooler@maine.gov.

STATE OF MAINE DEPARTMENT OF TRANSPORTATION
Bid Guaranty-Bid Bond Form

KNOW ALL MEN BY THESE PRESENTS THAT_____

_____, of the City/Town of _____ and State of _____

as Principal, and _____ as Surety, a

Corporation duly organized under the laws of the State of _____ and having a usual place of

Business in _____ and hereby held and firmly bound unto the Treasurer of

the State of Maine in the sum of _____ for payment which Principal and Surety bind

themselves, their heirs, executors, administrators, successors and assigns, jointly and severally.

The condition of this obligation is that the Principal has submitted to the Maine Department of

Transportation, hereafter Department, a certain bid, attached hereto and incorporated as a

part herein, to enter into a written contract for the construction of _____

_____ and if the Department shall accept said bid

and the Principal shall execute and deliver a contract in the form attached hereto (properly

completed in accordance with said bid) and shall furnish bonds for this faithful performance of

said contract, and for the payment of all persons performing labor or furnishing material in

connection therewith, and shall in all other respects perform the agreement created by the

acceptance of said bid, then this obligation shall be null and void; otherwise it shall remain in full

force, and effect.

Signed and sealed this _____ day of _____ 20_____

WITNESS:

WITNESS

PRINCIPAL:

By _____

By: _____

By: _____

SURETY:

By _____

By: _____

Name of Local Agency: _____

NOTICE

For security and other reasons, all Bid Packages which are mailed, shall be provided in double (one envelope inside the other) envelopes. The *Inner Envelope* shall have the following information provided on it:

Bid Enclosed - Do Not Open

PIN:

Town:

Date of Bid Opening:

Name of Contractor with mailing address and telephone number:

In Addition to the usual address information, the *Outer Envelope* should have written or typed on it:

Double Envelope: Bid Enclosed

PIN:

Town:

Date of Bid Opening:

Name of Contractor:

This should not be much of a change for those of you who use Federal Express or similar services.

Hand-carried Bids may be in one envelope as before, and should be marked with the following information:

Bid Enclosed: Do Not Open

PIN:

Town:

Name of Contractor:

INSTRUCTIONS FOR PREPARING THE CONTRACTOR'S DISADVANTAGED BUSINESS ENTERPRISE UTILIZATION PLAN

The Contractor Shall:

1. Submit a completed Contractor's Disadvantaged Business Enterprise Utilization Plan to the Contract's Engineer by 4:30 P.M. on the Bid day.
2. Extend equal opportunity to MDOT certified DBE firms (as listed in MDOT's DBE Directory of Certified Businesses) in the selection and utilization of Subcontractors and Suppliers.

SPECIFIC INSTRUCTIONS FOR COMPLETING THE FORM:

Insert Contractor name, the name of the person(s) preparing the form, and that person(s) telephone and fax number.

Provide total Bid price, Federal Project Identification Number, and location of the Project work.

In the columns, name each DBE firm to be used, provide the Unit or Item cost of the Work/Product to be provided by the DBE firm, give a brief description of the Work, and the dollar value of the Work.

If no DBE firm is to be utilized, the Contractor must document the reason(s) why no DBE firms are being used. Specific supporting evidence of good faith efforts taken by Contractors to solicit DBE Bidders must be attached. This evidence, as a minimum, includes phone logs, e-mail and/or mail DBE solicitation records, and the documented results of these solicitations.

NOTICE

The Department has revised the Disadvantaged Business Enterprise Proposed Utilization form and the procedure that has been used for the past several months for Contractors to submit the form.

The Apparent Low Bidder now must submit the form by close of Business (4:30 P.M.) on Bid day.

The new Contractor's Disadvantaged Business Enterprise Proposed Utilization Plan form contains additional information that is required by USDOT.

The Disadvantaged Business Enterprise Proposed Utilization Plan form will no longer be used. The new Contractor's Disadvantaged Business Enterprise Proposed Utilization Plan form must be used.

A copy of the new Contractor's Disadvantaged Business Enterprise Proposed Utilization Plan and instructions for completing it are attached.

Note: Questions about DBE firms, or to obtain a printed copy of the DBE Directory, contact Equal Opportunity at (207) 624-3066.

MDOT's DBE Directory of Certified firms can also be obtained at http://www.state.me.us/mdot/humnres/o_equalo/cdwbed_h.htm

NOTICE

Bidders:

Please use the attached “Request for Information” form when faxing questions and comments concerning specific Contracts that have been Advertised for Bid. Include additional numbered pages as required.

REQUEST FOR INFORMATION

Response By:_____ Date: _____

CONTRACTOR'S DISADVANTAGED BUSINESS ENTERPRISE PROPOSED UTILIZATION PLAN

Low Bidder shall furnish completed form to Contracts Section by 4:30 P.M. on Bid Opening day.

TO: MDOT Contracts Section
16 State House Station,
Augusta, Me 04333-0016
or
Fax: 207-624-3431

Contractor: _____

Prepared by: _____

Telephone: _____ Fax: _____

BID PRICE: \$ _____ FEDERAL PROJECT # _____ LOCATION: _____

TOTAL DBE PARTICIPATION AS A PERCENT OF TOTAL BID PRICE = _____ %

DBE Firm*	Unit/Item Cost	Unit #	Description of work & Item Number	Actual \$ Value
Total >				

If no DBE firm(s) are used, bidder must document efforts made to secure DBE participation and attach supporting evidence of this effort:

_____.

Examples: Bidder relies wholly upon low quote subcontractor section, DBE firm(s) were not low quote.
No DBE firms bid.

*Only DBE firms certified by MDOT prior to bidding can be utilized by Contractor for DBE credit.
Directory of certified DBEs is available on MDOT's website: www.state.me.us/mdot

Equal Opportunity Use:

Plan received ____/____/____ Verified by: _____ Action: _____



Office of Human Resources

Equal Opportunity

MAINE DEPARTMENT OF TRANSPORTATION

Certified Disadvantaged and Women Business Enterprise

DBE DIRECTORY - MINORITY OWNED

WBE DIRECTORY - WOMEN OWNED

WEBSITE FOR DIRECTORY CAN BE FOUND AT:

http://www.state.me.us/mdot/humnres/o_equalo/cdwbed_h.htm

It is the responsibility of the Contractor to access the DBE Directory at this site in order to have the most current listings.

STATE OF MAINE DEPARTMENT OF TRANSPORTATION NOTICE TO CONTRACTORS

Sealed Bids addressed to the Maine Department of Transportation, Augusta, Maine 04333 and endorsed on the wrapper "Bids for Slope Stabilization in the town of Greenbush" will be received from contractors at the Reception Desk, Temporary Transportation Building in Winthrop, Maine, until 11:00 o'clock A.M. (prevailing time) on July 16, 2003, and at that time and place publicly opened and read. Bids will be accepted only from contractors prequalified by the Department of Transportation for Highway or Bridge projects. All other Bids will be rejected. MDOT is currently transitioning to provide for the option of electronic bidding. We now accept electronic bids for those bid packages posted on our electronic bid website. Electronic bids do not have to be accompanied by paper bids. Please note: the Department will accept a facsimile of the bid bond for the electronic bid; however, the original bid bond must then be received at the MDOT Contract Section within 72 hours of the bid opening. During this transition, dual bids (one paper, one electronic) will be accepted, with the paper copy taking precedence. For those who chose to submit a paper bid alone, nothing has changed.

Description: Maine Federal Aid Project No. STP-1203(600)X, PIN. 12036.00

Location: In Penobscot County, project is located along the slope of Rte.2 approx. 50 meters south of the northern intersection of Rte.2 and Lower River Road and 15 meters north of the southern intersection of Rte.2 and Middle River Rd.

Outline of Work: Steel H-beam piles, timber lagging wall and other incidental work.

The basis of award will be Section 0001.

For general information regarding Bidding and Contracting procedures, contact Bruce Carter at (207)624-3430. Our webpage at <http://www.state.me.us/mdot/project/design/homepg.htm> contains a copy of the schedule of items, Plan Holders List, written portions of bid amendments (not drawings), and bid results. For Project-specific information fax all questions to Project Manager Scott Rollins at (207)624-3481. Questions received after 12:00 noon of Monday prior to bid date will not be answered. Bidders shall not contact any other Departmental staff for clarification of Contract provisions, and the Department will not be responsible for any interpretations so obtained. Hearing impaired persons may call the Telecommunication Device for the Deaf at (207)287-3392.

Plans, specifications and bid forms may be seen at the Maine Department of Transportation, Temporary Transportation Building in Winthrop, Maine and at the Department of Transportation's Division III Office in Bangor. They may be purchased from the Department between the hours of 8:00 a.m. to 4:30 p.m. by cash, credit card (Visa/Mastercard) or check payable to Treasurer, State of Maine sent to Maine Department of Transportation, Attn.: Mailroom, 16 State House Station, Augusta, Maine 04333-0016. They also may be purchased by telephone at (207)624-3536 between the hours of 8:00 a.m. to 4:30 p.m. Half size plans \$6.00 (\$10.00 by mail), Bid Book \$10 (\$13 by mail), payment in advance, all non-refundable.

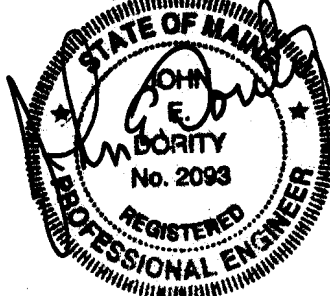
Each Bid must be made upon blank forms provided by the Department and must be accompanied by a bid bond at 5% of the bid amount or an official bank check, cashier's check, certified check, certificate of deposit, or United States postal money order in the amount of \$5,000.00 payable to Treasurer, State of Maine as a Bid guarantee. A Contract Performance Surety Bond and a Contract Payment Surety Bond, each in the amount of 100 percent of the Contract price, will be required of the successful Bidder.

This Contract is subject to all applicable Federal Laws. This contract is subject to compliance with the Disadvantaged Business Enterprise program requirements as set forth by the Maine Department of Transportation.

All work shall be governed by "State of Maine, Department of Transportation, Standard Specifications, Revision of December 2002", price \$10 [\$13 by mail], and Standard Details, Revision of December 2002, price \$20 [\$25 by mail]. Standard Detail updates can be found at <http://www.state.me.us/mdot/project/design/homepg.htm>

The right is hereby reserved to the MDOT to reject any or all bids.

Winthrop, Maine
July 2, 2003



JOHN E. DORITY
CHIEF ENGINEER

**ACKNOWLEDGMENT OF BID AMENDMENTS
&
SUBMISSION OF BID BOND VALIDATION NUMBER (IF APPLICABLE)**

With this form, the Bidder acknowledges its responsibility to check for all Amendments to the Bid Package. For each Project under Advertisement, Amendments are located at <http://www.state.me.us/mdot/project/design/schedule.htm>. It is the responsibility of the Bidder to determine if there are Amendments to the Project, to download them, and to incorporate them into their Bid Package. The Maine DOT will not post Bid Amendments any later than noon the day before Bid opening.

Amendment Number	Date

The Contractor, for itself, its successors and assigns, hereby acknowledges that it has received all of the above referenced Amendments to the Bid Package. Failure to acknowledge receipt of all Amendments to the Bid Package will be considered a Non-curable Bid Defect in accordance with Section 102.11.1 of the Standard Specifications, Revision of December 2002.

CONTRACTOR

Date

Signature of authorized representative

(Name and Title Printed)

Bid Bond Validation Number _____
(Applicable to annual bid bonds or electronic bid bonds.)

MAINE DEPARTMENT OF TRANSPORTATION

BID

DATE OF OPENING :

CALL ORDER :

CONTRACT ID : 012036.00

PROJECTS

STP-1203(600)X

COUNTY : PENOBSHOT

SCHEDULE OF ITEMS

REVISED:

CONTRACT ID: 012036.00

PROJECT(S): STP-1203(600)X

CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS CTS	BID AMOUNT DOLLARS CTS
SECTION 0001 HIGHWAY ITEMS				
0010	501.52 STEEL H-BEAM PILES 152 KG/M, DELIVERED	1135.000 M		
0020	501.521 STEEL H-BEAM PILES 152 KG/M, IN PLACE	1135.000 M		
0030	501.92 PILE DRIVING EQUIPMENT MOBILIZATION	LUMP	LUMP	
0040	526.301 TEMPORARY CONCRETE BARRIER TYPE I	LUMP	LUMP	
0050	629.05 HAND LABOR, STRAIGHT TIME	10.000 HR		
0060	631.12 ALL PURPOSE EXCAVATOR (INCLUDING OPERATOR)	10.000 HR		
0070	631.172 TRUCK - LARGE (INCLUDING OPERATOR)	10.000 HR		
0080	635.20 TIMBER LAGGING WALL	33.000 M2		
0090	652.33 DRUM	15.000 EA		
0100	652.34 CONE	20.000 EA		

SCHEDULE OF ITEMS

REVISED:

CONTRACT ID: 012036.00

PROJECT(S): STP-1203(600)X

CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0110	652.35 CONSTRUCTION SIGNS	10.000 M2				
0120	652.361 MAINTENANCE OF TRAFFIC CONTROL DEVICES	LUMP	LUMP			
0130	652.38 FLAGGER	80.000 HR				
0140	656.75 TEMPORARY SOIL EROSION AND WATER POLLUTION CONTROL	LUMP	LUMP			
	SECTION 0001 TOTAL					
	TOTAL BID					

CONTRACT AGREEMENT, OFFER & AWARD

AGREEMENT made on the date last signed below, by and between the State of Maine, acting through and by its Department of Transportation (Department), an agency of state government with its principal administrative offices located at 1705 U.S. Route 202, Winthrop, Maine, with a mailing address at 16 State House Station, Augusta, Maine 04333-0016, and (Name of the firm bidding the job) a corporation or other legal entity organized under the laws of the State of Maine, with its principal place of business located at (address of the firm bidding the job)

The Department and the Contractor, in consideration of the mutual promises set forth in this Agreement (the "Contract"), hereby agree as follows:

A. The Work.

The Contractor agrees to complete all Work as specified or indicated in the Contract including Extra Work in conformity with the Contract, PIN No. 1224.00

for the Hot Mix Asphalt Overlay in the town/city of West Eastport, County of Washington, Maine. The Work includes construction, maintenance during construction, warranty as provided in the Contract, and other incidental work.

The Contractor shall be responsible for furnishing all supervision, labor, equipment, tools supplies, permanent materials and temporary materials required to perform the Work including construction quality control including inspection, testing and documentation, all required documentation at the conclusion of the project, warranting its work and performing all other work indicated in the Contract.

The Department shall have the right to alter the nature and extent of the Work as provided in the Contract; payment to be made as provided in the same.

B. Time.

The Contractor agrees to complete all Work, except warranty work, on or before November 15, 2003. Further, the Department may deduct from moneys otherwise due the Contractor, not as a penalty, but as Liquidated Damages in accordance with Sections 107.7 and 107.8 of the State of Maine Department of Transportation Standard Specifications, Revision of December 2002.

C. Price.

The quantities given in the Schedule of Items of the Bid Package will be used as the basis for determining the original Contract amount and for determining the amounts of the required Performance Surety Bond and Payment Surety Bond, and that the amount of this offer is (Place bid here in alphabetical form such as One Hundred and Two dollars and 10 cents)
\$ (repeat bid here in numerical terms, such as \$102.10) Performance Bond and Payment Bond each being 100% of the amount of this Contract.

D. Contract.

This Contract, which may be amended, modified, or supplemented in writing only, consists of the Contract documents as defined in the Plans, Standard Specifications, Revision of December 2002, Standard Details Revision of December 2002, Supplemental Specifications, Special Provisions, Contract Agreement; and Contract Bonds. It is agreed and understood that this Contract will be governed by the documents listed above.

E. Certifications.

By signing below, the Contractor hereby certifies that to the best of the Contractor's knowledge and belief:

1. All of the statements, representations, covenants, and/or certifications required or set forth in the Bid and the Bid Documents, including those in Appendix A to Division 100 of the Standard Specifications Revision of December 2002 (Federal Contract Provisions Supplement), and the Contract are still complete and accurate as of the date of this Agreement.
2. The Contractor knows of no legal, contractual, or financial impediment to entering into this Contract.
3. The person signing below is legally authorized by the Contractor to sign this Contract on behalf of the Contractor and to legally bind the Contractor to the terms of the Contract.

F. Offer.

The undersigned, having carefully examined the site of work, the Plans, Standard Specifications, Revision of December 2002, Standard Details Revision of December 2002, Supplemental Specifications, Special Provisions, Contract Agreement; and Contract Bonds contained herein for construction of:

PIN 1234.00 West Eastport, Hot Mix Asphalt Overlay

State of Maine, on which bids will be received until the time specified in the "Notice to Contractors" do(es) hereby bid and offer to enter into this contract to supply all the materials, tools, equipment and labor to construct the whole of the Work in strict accordance with the terms and conditions of this Contract at the unit prices in the attached "Schedule of Items".

The Offeror agrees to perform the work required at the price specified above and in accordance with the bids provided in the attached "Schedule of Items" in strict accordance with the terms of this solicitation, and to provide the appropriate insurance and bonds if this offer is accepted by the Government in writing.

As Offeror also agrees:

First: To do any extra work, not covered by the attached "Schedule of Items", which may be ordered by the Resident, and to accept as full compensation the amount determined upon a "Force Account" basis as provided in the Standard Specifications, Revision of December 2002, and as addressed in the contract documents.

Second: That the bid bond at 5% of the bid amount or the official bank check, cashier's check, certificate of deposit or U. S. Postal Money Order in the amount given in the "Notice to Contractors", payable to the Treasurer of the State of Maine and accompanying this bid, shall be forfeited, as liquidated damages, if in case this bid is accepted, and the undersigned shall fail to abide by the terms and conditions of the offer and fail to furnish satisfactory insurance and Contract bonds under the conditions stipulated in the Specifications within 15 days of notice of intent to award the contract.

Third: To begin the Work on the date specified in the Engineer's "Notice to Commence Work" as stated in Section 107.2 of the Standard Specifications Revision of 2002 and complete the Work within the time limits given in the Special Provisions of this Contract.

Fourth: The Contractor will be bound to the Disadvantaged Business Enterprise (DBE) Requirements contained in the attached Notice (Additional Instructions to Bidders) and submit a completed Contractor's Disadvantaged Business Enterprise Utilization Plan by 4:30pm on the day of bid opening to the Contracts Engineer.

Fifth: That this offer shall remain open for 30 calendar days after the date of opening of bids.

Sixth: The Bidder hereby certifies, to the best of its knowledge and belief that: the Bidder has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of competitive bidding in connection with its bid, and its subsequent contract with the Department.

IN WITNESS WHEREOF, the Contractor, for itself, its successors and assigns, hereby execute two duplicate originals of this Agreement and thereby binds itself to all covenants, terms, and obligations contained in the Contract Documents.

Date

(Witness Sign Here)
Witness

CONTRACTOR
(Sign Here)

(Signature of Legally Authorized Representative
of the Contractor)

(Print Name Here)
(Name and Title Printed)

G. Award.

Your offer is hereby accepted.
documents referenced herein.

This award consummates the Contract, and the

MAINE DEPARTMENT OF TRANSPORTATION

Date

By: David A. Cole, Commissioner

(Witness)

CONTRACT AGREEMENT, OFFER & AWARD

AGREEMENT made on the date last signed below, by and between the State of Maine, acting through and by its Department of Transportation (Department), an agency of state government with its principal administrative offices located at 1705 U.S. Route 202, Winthrop, Maine, with a mailing address at 16 State House Station, Augusta, Maine 04333-0016, and _____ a corporation or other legal entity organized under the laws of the State of Maine, with its principal place of business located at _____

The Department and the Contractor, in consideration of the mutual promises set forth in this Agreement (the "Contract"), hereby agree as follows:

A. The Work.

The Contractor agrees to complete all Work as specified or indicated in the Contract including Extra Work in conformity with the Contract, PIN No. **12036.00** for **Slope Stabilization** in the town of **Greenbush**, County of **Penobscot**, Maine. The Work includes construction, maintenance during construction, warranty as provided in the Contract, and other incidental work.

The Contractor shall be responsible for furnishing all supervision, labor, equipment, tools supplies, permanent materials and temporary materials required to perform the Work including construction quality control including inspection, testing and documentation, all required documentation at the conclusion of the project, warranting its work and performing all other work indicated in the Contract.

The Department shall have the right to alter the nature and extent of the Work as provided in the Contract; payment to be made as provided in the same.

B. Time.

The Contractor agrees to complete all Work, except warranty work, on or before **October 10, 2003**. Further, the Department may deduct from moneys otherwise due the Contractor, not as a penalty, but as Liquidated Damages in accordance with Sections 107.7 and 107.8 of the State of Maine Department of Transportation Standard Specifications, Revision of December 2002.

C. Price.

The quantities given in the Schedule of Items of the Bid Package will be used as the basis for determining the original Contract amount and for determining the amounts of the required Performance Surety Bond and Payment Surety Bond, and that the amount of this offer is _____

\$_____ Performance Bond and Payment Bond each being 100% of the amount of this Contract.

D. Contract.

This Contract, which may be amended, modified, or supplemented in writing only, consists of the Contract documents as defined in the Plans, Standard Specifications, Revision of December 2002, Standard Details Revision of December 2002 as updated through advertisement, Supplemental Specifications, Special Provisions, Contract Agreement; and Contract Bonds. It is agreed and understood that this Contract will be governed by the documents listed above.

E. Certifications.

By signing below, the Contractor hereby certifies that to the best of the Contractor's knowledge and belief:

1. All of the statements, representations, covenants, and/or certifications required or set forth in the Bid and the Bid Documents, including those in Appendix A to Division 100 of the Standard Specifications Revision of December 2002 (Federal Contract Provisions Supplement), and the Contract are still complete and accurate as of the date of this Agreement.
2. The Contractor knows of no legal, contractual, or financial impediment to entering into this Contract.
3. The person signing below is legally authorized by the Contractor to sign this Contract on behalf of the Contractor and to legally bind the Contractor to the terms of the Contract.

F. Offer.

The undersigned, having carefully examined the site of work, the Plans, Standard Specifications Revision of December 2002, Standard Details Revision of December 2002 as updated through advertisement, Supplemental Specifications, Special Provisions, Contract Agreement; and Contract Bonds contained herein for construction of:

PIN. 12036.00 - Slope Stabilization - in the town of Greenbush,

State of Maine, on which bids will be received until the time specified in the "Notice to Contractors" do(es) hereby bid and offer to enter into this contract to supply all the materials, tools, equipment and labor to construct the whole of the Work in strict accordance with the terms and conditions of this Contract at the unit prices in the attached "Schedule of Items".

The Offeror agrees to perform the work required at the price specified above and in accordance with the bids provided in the attached "Schedule of Items" in strict accordance with the terms of this solicitation, and to provide the appropriate insurance and bonds if this offer is accepted by the Government in writing.

As Offeror also agrees:

First: To do any extra work, not covered by the attached "Schedule of Items", which may be ordered by the Resident, and to accept as full compensation the amount determined upon a "Force Account" basis as provided in the Standard Specifications, Revision of December 2002, and as addressed in the contract documents.

Second: That the bid bond at 5% of the bid amount or the official bank check, cashier's check, certificate of deposit or U. S. Postal Money Order in the amount given in the "Notice to Contractors", payable to the Treasurer of the State of Maine and accompanying this bid, shall be forfeited, as liquidated damages, if in case this bid is accepted, and the undersigned shall fail to abide by the terms and conditions of the offer and fail to furnish satisfactory insurance and Contract bonds under the conditions stipulated in the Specifications within 15 days of notice of intent to award the contract.

Third: To begin the Work on the date specified in the Engineer's "Notice to Commence Work" as stated in Section 107.2 of the Standard Specifications Revision of December 2002 and complete the Work within the time limits given in the Special Provisions of this Contract.

Fourth: The Contractor will be bound to the Disadvantaged Business Enterprise (DBE) Requirements contained in the attached Notice (Additional Instructions to Bidders) and submit a completed Contractor's Disadvantaged Business Enterprise Utilization Plan by 4:30pm on the day of bid opening to the Contracts Engineer.

Fifth: That this offer shall remain open for 30 calendar days after the date of opening of bids.

Sixth: The Bidder hereby certifies, to the best of its knowledge and belief that: the Bidder has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of competitive bidding in connection with its bid, and its subsequent contract with the Department.

IN WITNESS WHEREOF, the Contractor, for itself, its successors and assigns, hereby execute two duplicate originals of this Agreement and thereby binds itself to all covenants, terms, and obligations contained in the Contract Documents.

CONTRACTOR

Date

(Signature of Legally Authorized Representative
of the Contractor)

Witness

(Name and Title Printed)

G. Award.

Your offer is hereby accepted.
documents referenced herein.

This award consummates the Contract, and the

MAINE DEPARTMENT OF TRANSPORTATION

Date

By: David A. Cole, Commissioner

Witness

CONTRACT AGREEMENT, OFFER & AWARD

AGREEMENT made on the date last signed below, by and between the State of Maine, acting through and by its Department of Transportation (Department), an agency of state government with its principal administrative offices located at 1705 U.S. Route 202, Winthrop, Maine, with a mailing address at 16 State House Station, Augusta, Maine 04333-0016, and _____ a corporation or other legal entity organized under the laws of the State of Maine, with its principal place of business located at _____

The Department and the Contractor, in consideration of the mutual promises set forth in this Agreement (the "Contract"), hereby agree as follows:

A. The Work.

The Contractor agrees to complete all Work as specified or indicated in the Contract including Extra Work in conformity with the Contract, PIN No. **12036.00** for **Slope Stabilization** in the town of **Greenbush**, County of **Penobscot**, Maine. The Work includes construction, maintenance during construction, warranty as provided in the Contract, and other incidental work.

The Contractor shall be responsible for furnishing all supervision, labor, equipment, tools supplies, permanent materials and temporary materials required to perform the Work including construction quality control including inspection, testing and documentation, all required documentation at the conclusion of the project, warranting its work and performing all other work indicated in the Contract.

The Department shall have the right to alter the nature and extent of the Work as provided in the Contract; payment to be made as provided in the same.

B. Time.

The Contractor agrees to complete all Work, except warranty work, on or before **October 10, 2003**. Further, the Department may deduct from moneys otherwise due the Contractor, not as a penalty, but as Liquidated Damages in accordance with Sections 107.7 and 107.8 of the State of Maine Department of Transportation Standard Specifications, Revision of December 2002.

C. Price.

The quantities given in the Schedule of Items of the Bid Package will be used as the basis for determining the original Contract amount and for determining the amounts of the required Performance Surety Bond and Payment Surety Bond, and that the amount of this offer is _____

\$_____ Performance Bond and Payment Bond each being 100% of the amount of this Contract.

D. Contract.

This Contract, which may be amended, modified, or supplemented in writing only, consists of the Contract documents as defined in the Plans, Standard Specifications, Revision of December 2002, Standard Details Revision of December 2002 as updated through advertisement, Supplemental Specifications, Special Provisions, Contract Agreement; and Contract Bonds. It is agreed and understood that this Contract will be governed by the documents listed above.

E. Certifications.

By signing below, the Contractor hereby certifies that to the best of the Contractor's knowledge and belief:

1. All of the statements, representations, covenants, and/or certifications required or set forth in the Bid and the Bid Documents, including those in Appendix A to Division 100 of the Standard Specifications Revision of December 2002 (Federal Contract Provisions Supplement), and the Contract are still complete and accurate as of the date of this Agreement.
2. The Contractor knows of no legal, contractual, or financial impediment to entering into this Contract.
3. The person signing below is legally authorized by the Contractor to sign this Contract on behalf of the Contractor and to legally bind the Contractor to the terms of the Contract.

F. Offer.

The undersigned, having carefully examined the site of work, the Plans, Standard Specifications Revision of December 2002, Standard Details Revision of December 2002 as updated through advertisement, Supplemental Specifications, Special Provisions, Contract Agreement; and Contract Bonds contained herein for construction of:

PIN. 12036.00 - Slope Stabilization - in the town of Greenbush,

State of Maine, on which bids will be received until the time specified in the "Notice to Contractors" do(es) hereby bid and offer to enter into this contract to supply all the materials, tools, equipment and labor to construct the whole of the Work in strict accordance with the terms and conditions of this Contract at the unit prices in the attached "Schedule of Items".

The Offeror agrees to perform the work required at the price specified above and in accordance with the bids provided in the attached "Schedule of Items" in strict accordance with the terms of this solicitation, and to provide the appropriate insurance and bonds if this offer is accepted by the Government in writing.

As Offeror also agrees:

First: To do any extra work, not covered by the attached "Schedule of Items", which may be ordered by the Resident, and to accept as full compensation the amount determined upon a "Force Account" basis as provided in the Standard Specifications, Revision of December 2002, and as addressed in the contract documents.

Second: That the bid bond at 5% of the bid amount or the official bank check, cashier's check, certificate of deposit or U. S. Postal Money Order in the amount given in the "Notice to Contractors", payable to the Treasurer of the State of Maine and accompanying this bid, shall be forfeited, as liquidated damages, if in case this bid is accepted, and the undersigned shall fail to abide by the terms and conditions of the offer and fail to furnish satisfactory insurance and Contract bonds under the conditions stipulated in the Specifications within 15 days of notice of intent to award the contract.

Third: To begin the Work on the date specified in the Engineer's "Notice to Commence Work" as stated in Section 107.2 of the Standard Specifications Revision of December 2002 and complete the Work within the time limits given in the Special Provisions of this Contract.

Fourth: The Contractor will be bound to the Disadvantaged Business Enterprise (DBE) Requirements contained in the attached Notice (Additional Instructions to Bidders) and submit a completed Contractor's Disadvantaged Business Enterprise Utilization Plan by 4:30pm on the day of bid opening to the Contracts Engineer.

Fifth: That this offer shall remain open for 30 calendar days after the date of opening of bids.

Sixth: The Bidder hereby certifies, to the best of its knowledge and belief that: the Bidder has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of competitive bidding in connection with its bid, and its subsequent contract with the Department.

IN WITNESS WHEREOF, the Contractor, for itself, its successors and assigns, hereby execute two duplicate originals of this Agreement and thereby binds itself to all covenants, terms, and obligations contained in the Contract Documents.

CONTRACTOR

Date

(Signature of Legally Authorized Representative
of the Contractor)

Witness

(Name and Title Printed)

G. Award.

Your offer is hereby accepted.
documents referenced herein.

This award consummates the Contract, and the

MAINE DEPARTMENT OF TRANSPORTATION

Date

By: David A. Cole, Commissioner

Witness

BOND # _____

CONTRACT PERFORMANCE BOND
(Surety Company Form)

KNOW ALL MEN BY THESE PRESENTS: That _____
_____ **and the State of** _____, as principal,
and _____,
a corporation duly organized under the laws of the State of _____ and having a
usual place of business _____,
as Surety, are held and firmly bound unto the Treasurer of the State of Maine in the sum
of _____ **and 00/100 Dollars (\$** _____ **)**,
to be paid said Treasurer of the State of Maine or his successors in office, for which
payment well and truly to be made, Principal and Surety bind themselves, their heirs,
executors and administrators, successors and assigns, jointly and severally by these
presents.

The condition of this obligation is such that if the Principal designated as Contractor in
the Contract to construct Project Number _____ in the Municipality of _____
promptly and faithfully performs the Contract, then this
obligation shall be null and void; otherwise it shall remain in full force and effect.

The Surety hereby waives notice of any alteration or extension of time made by the State
of Maine.

Signed and sealed this _____ day of _____, 20....

WITNESSES:

SIGNATURES:

CONTRACTOR:

Signature.....

Print Name Legibly

Print Name Legibly

SURETY:

Signature

Print Name Legibly

Print Name Legibly

SURETY ADDRESS:

NAME OF LOCAL AGENCY:

ADDRESS

.....

.....

.....

.....

TELEPHONE.....

.....

BOND # _____

CONTRACT PAYMENT BOND
(Surety Company Form)

KNOW ALL MEN BY THESE PRESENTS: That _____
_____ **and the State of** _____, as principal,
and _____
a corporation duly organized under the laws of the State of _____ and having a
usual place of business in _____,
as Surety, are held and firmly bound unto the Treasurer of the State of Maine for the use
and benefit of claimants as herein below defined, in the sum of
_____ **and 00/100 Dollars (\$** _____ **)**
for the payment whereof Principal and Surety bind themselves, their heirs, executors and
administrators, successors and assigns, jointly and severally by these presents.

The condition of this obligation is such that if the Principal designated as Contractor in
the Contract to construct Project Number _____ in the Municipality of
_____ promptly satisfies all claims and demands incurred for all
labor and material, used or required by him in connection with the work contemplated by
said Contract, and fully reimburses the obligee for all outlay and expense which the
obligee may incur in making good any default of said Principal, then this obligation shall
be null and void; otherwise it shall remain in full force and effect.

A claimant is defined as one having a direct contract with the Principal or with a
Subcontractor of the Principal for labor, material or both, used or reasonably required for
use in the performance of the contract.

Signed and sealed this _____ day of _____, 20 .. .

WITNESS:

SIGNATURES:

CONTRACTOR:

Signature.....

Print Name Legibly

SURETY:

Signature.....

Print Name Legibly

SURETY ADDRESS:

NAME OF LOCAL AGENCY:

ADDRESS

.....

TELEPHONE

SPECIAL PROVISIONS
SECTION 104
Utilities

MEETING

A Preconstruction Utility Conference, as defined in Subsection 104.4.6 of the Standard Specifications is required.

GENERAL INFORMATION

These Special Provisions outline the arrangements that have been made by the Department for utility and/or railroad work to be undertaken in conjunction with this project. The following list identifies all known utilities or railroads having facilities presently located within the limits of this project or intending to install facilities during project construction

Overview:

Utility/Railroad	Aerial	Underground	Railroad
Bangor Hydro-Electric Company	X		
Adelphia Communications Corporation	X		
Verizon	X		

Temporary utility adjustments are **not** anticipated.

Unless otherwise specified, any underground utility facilities shown on the project plans represent approximate locations gathered from available information. The Department cannot certify the level of accuracy of this data. Underground facilities indicated on the topographic sheets (plan views) have been collected from historical records and/or on-site designations provided by the respective utility companies. Underground facilities indicated on the cross-sections have been carried over from the plan view data and may also include further approximations of the elevations (depths) based upon straight-line interpolation from the nearest manholes, gate valves, or test pits.

All adjustments are to be made by the respective utility/railroad unless otherwise specified herein.

All clearing and tree removal in areas where utilities are involved must be completed before the utilities are able to relocate their facilities.

Fire hydrants shall not be disturbed until all necessary work has been accomplished to provide proper fire protection.

Town: **Greenbush**

Project: **12036.00**

Date: **June 3, 2003**

AERIAL

Summary:

Utility	Pole Set	New Wires/ Cables	Trans. Wires/ Cables	Remove Poles	Estimate d Working Days
Bangor Hydro-Electric Company	X	X		X	1
Adelphia		X			Done
Verizon		X			10
Total:					11

Utility Specific Issues:

Bangor Hydro-Electric Company

Bob Peasley 973-2518

Bangor Hydro has completed their new pole and cable installations. Poles will be removed after all transfers have been completed.

Adelphia Communications Corporation

Steve Bossie 1-877-500-1055

Adelphia has completed their new installations.

Verizon

Ernie Mayo 990-5243

Verizon estimates five (5) working days to run new cable (done) and ten (10) working days to splice cables. Verizon is currently splicing their cables and anticipate completion prior to contract award.

Pole List:

Existing Pole #	Existing Station	Left/Right		Existing Offset	Proposed Station	Left/Right		Proposed Offset	Comments
		LT	RT			LT	RT		
262						X		9.75	To Remain
263		X			1+033.21		X	9.75	New Pole
264		X			1+103.32		X	11.89	New Pole
265		X			1+156.66		X	11.73	New Pole
266		X			1+225.24		X	9.44	New Pole
267		X			1+291.20	X		10.67	New Pole

DIG SAFE

The Contractor shall be responsible for determining the presence of underground utility facilities prior to commencing any excavation work and shall notify utilities of proposed excavation in accordance with M.R.S.A. Title 23 §3360-A, Maine "Dig Safe" System. **1-888-344-7233**

Town: **Greenbush**
Project: **12036.00**
Date: **June 3, 2003**

THE CONTRACTOR SHALL PLAN AND CONDUCT HIS WORK ACCORDINGLY.

Greenbush
1203(600)X
June 17, 2003

SPECIAL PROVISION
SECTION 107
TIME

The specified contract completion date is October 10, 2003.

SPECIAL PROVISION
CORRECTIONS, ADDITIONS AND REVISIONS
Standard Specifications - Revision of December 2002

SECTION 101
CONTRACT INTERPRETATION

101.2 Definitions - Closeout Documentation

Replace the sentence “A letter stating the amount..... DBE goals.” with “DBE Goal Attainment Verification Form”

SECTION 102
DELIVERY OF BIDS
(Location and Time)

102.7.1 Location and Time

Add the following sentence “As a minimum, the Bidder will submit a Bid Package consisting of the Notice to Contractors, the completed Acknowledgement of Bid Amendments & Submission of Bid Bond Validation Number form, the completed Schedule of Items, 2 copies of the completed Agreement, Offer, & Award form, a Bid Bond or Bid Guarantee, and any other Certifications or Bid Requirements listed in the Bid Book.”

SECTION 106
QUALITY

106.6 Acceptance Add the following to paragraph 1 of A: “This includes Sections 401 - Hot Mix Asphalt, 402 - Pavement Smoothness, and 502 - Structural Concrete - Method A - Air Content.”

Add the following to the beginning of paragraph 3 of A: “For pay factors based on Quality Level Analysis, and”

SECTION 107
TIME

107.3.1 General Add the following: “If a Holiday occurs on a Sunday, the following Monday shall be considered a Holiday. Sunday or Holiday work must be approved by the Department, except that the Contractor may work on Martin Luther King Day, President’s Day, Patriot’s Day, the Friday after Thanksgiving, and Columbus Day without the Department’s approval.”

SECTION 402
PAVEMENT SMOOTHNESS

Add the following:

“Projects to have their pavement smoothness analyzed in accordance with this Specification will be so noted in Special Provision 403 - Bituminous Box.”

“402.02 Lot Size Lot size for smoothness will be 1000 lane-meters [3000 lane-feet]. A subplot will consist of 20 lane-meters [50 lane-feet]. Partial lots will be included in the previous lot if less than one-half the size of a normal lot. If greater than one-half the normal lot size, it will be tested as a separate lot.”

SECTION 502
STRUCTURAL CONCRETE

502.0502 Quality Assurance Method A - Rejection by Resident Change the first sentence to read: “For an individual subplot with test results failing to meet the criteria in Table #1, or if the calculated pay factor for Air Content is less than 0.80.....”

502.0503 Quality Assurance Method B - Rejection by Resident Change the first sentence to read: “For material represented by a verification test with test results failing to meet the criteria in Table #1, the Department will.....”

502.0505 Resolution of Disputed Acceptance Test Results Combine the second and third sentence to read: “Circumstances may arise, however, where the Department may”

SECTION 604
MANHOLES, INLETS, AND CATCH BASINS

604.02 Materials Add the following:

“Tops and Traps	712.07
Corrugated Metal Units	712.08
Catch Basin and Manhole Steps	712.09”

SECTION 615 LOAM

618.02 Materials Make the following change:

<u>Organic Content</u>	<u>Percent by Volume</u>
Humus	“5% - 10%”, as determined by
Ignition Test	

SECTION 618 SEEDING

618.01 Description Change the first sentence to read as follows: “This work shall consist of furnishing and applying seed”

Remove “,and cellulose fiber mulch” from 618.01(a).

618.03 Rates of Application In 618.03(a), remove the last sentence and replace with the following: “These rates shall apply to Seeding Method 2, 3, and Crown Vetch.”

618.09 Construction Method In 618.09(a) 1, sentence two, replace “100 mm [4 in]” with “25 mm [1 in] (Method 1 areas) and 50 mm [2 in] (Method 2 areas)”

SECTION 620 GEOTEXTILES

620.03 Placement Section (c)

Title: Replace “Non-woven” in title with “Erosion Control”.

First Paragraph: Replace first word “Non-woven” with “Woven monofilament”.

Second Paragraph: Replace second word “Non-woven” with “Erosion Control”.

620.07 Shipment, Storage, Protection and Repair of Fabric Section (a)

Replace the third sentence with the following: “Damaged geotextiles, as identified by the Resident, shall be repaired immediately.”

620.09 Basis of Payment

Pay Item 620.58: Replace “Non-woven” with “Erosion Control”

Pay Item 620.59: Replace “Non-woven” with “Erosion Control”

SECTION 712 MISCELLANEOUS HIGHWAY MATERIALS

Add the following:

“712.07 Tops, and Traps These metal units shall conform to the plan dimensions and to the following specification requirements for the designated materials.

Gray iron castings shall conform to the requirements of AASHTO M105, Class 30, unless otherwise designated.

Carbon steel castings shall conform to the requirements of AASHTO M103/M103M. Grade shall be 450-240 [65-35] unless otherwise designated.

Structural steel shall conform to the requirements of AASHTO M183/M183M or ASTM A283/A283M, Grade B or better. Galvanizing, where specified for these units, shall conform to the requirements of AASHTO M111.

712.08 Corrugated Metal Units The units shall conform to plan dimensions and the metal to AASHTO M36/M36M. Bituminous coating, when specified, shall conform to AASHTO M190 Type A.

712.09 Catch Basin and Manhole Steps Steps for catch basins and for manholes shall conform to ASTM C478M [ASTM C478], Section 13 for either of the following material:

- (a) Aluminum steps-ASTM B221M, [ASTM B211] Alloy 6061-T6 or 6005-T5.
- (b) Reinforced plastic steps Steel reinforcing bar with injection molded plastic coating copolymer polypropylene. Polypropylene shall conform to ASTM D 4101.

712.23 Flashing Lights Flashing Lights shall be power operated or battery operated as specified.

- (a) Power operated flashing lights shall consist of housing, adapters, lamps, sockets, reflectors, lens, hoods and other necessary equipment designed to give clearly visible signal indications within an angle of at least 45 degrees and from 3 to 90 m [10 to 300 ft] under all light and atmospheric conditions.

Two circuit flasher controllers with a two-circuit filter capable of providing alternate flashing operations at the rate of not less than 50 nor more than 60 flashes per minute shall be provided.

The lamps shall be 650 lumens, 120 volt traffic signal lamps with sockets constructed to properly focus and hold the lamp firmly in position.

The housing shall have a rotatable sun visor not less than 175 mm [7 in] in length designed to shield the lens.

Reflectors shall be of such design that light from a properly focused lamp will reflect the light rays parallel. Reflectors shall have a maximum diameter at the point of contact with the lens of approximately 200 mm [8 in].

The lens shall consist of a round one-piece convex amber material which, when mounted, shall have a visible diameter of approximately 200 mm [8 in]. They shall distribute light and not diffuse it. The distribution of the light shall be asymmetrical in a downward direction. The light distribution of the lens shall not be uniform, but shall consist of a small high intensity portion with narrow distribution for long distance throw and a larger low intensity portion with wide distribution for short distance throw. Lenses shall be marked to indicate the top and bottom of the lens.

(b) Battery operated flashing lights shall be self-illuminated by an electric lamp behind the lens. These lights shall also be externally illuminated by reflex-reflective elements built into the lens to enable it to be seen by reflex-reflection of the light from the headlights of oncoming traffic. The batteries must be entirely enclosed in a case. A locking device must secure the case. The light shall have a flash rate of not less than 50 nor more than 60 flashes per minute from minus 30 °C [minus 20 °F] to plus 65 °C [plus 150 °F]. The light shall have an on time of not less than 10 percent of the flash cycle. The light beam projected upon a surface perpendicular to the axis of the light beam shall produce a lighted rectangular projection whose minimum horizontal dimension shall be 5 degrees each side of the horizontal axis. The effective intensity shall not have an initial value greater than 15.0 candelas or drop below 4.0 candelas during the first 336 hours of continuous flashing. The illuminated lens shall appear to be uniformly bright over its entire illuminated surface when viewed from any point within an angle of 9 degrees each side of the vertical axis and 5 degrees each side of the horizontal axis. The lens shall not be less than 175 mm [7 in] in diameter including a reflex-reflector ring of 13 mm [½ in] minimum width around the periphery. The lens shall be yellow in color and have a minimum relative luminous transmittance of 0.440 with a luminance of 2854° Kelvin. The lens shall be one-piece construction. The lens material shall be plastic and meet the luminous transmission requirements of this specification. The case containing the batteries and circuitry shall be constructed of a material capable of withstanding abuse equal to or greater than 1.21 mm thick steel [No. 18 U.S. Standard Gage Steel]. The housing and the lens frame, if of metal shall be properly cleaned, degreased and pretreated to promote adhesion. It shall be given one or more coats of enamel which, when dry shall completely obscure the metal. The enamel coating shall be of such quality that when the coated case is struck a light blow with a sharp tool, the paint will not chip or crack and if scratched with a knife

will not powder. The case shall be so constructed and closed as to exclude moisture that would affect the proper operation of light. The case shall have a weep hole to allow the escape of moisture from condensation. Photoelectric controls, if provided, shall keep the light operating whenever the ambient light falls below 215 lx [20 foot candles]. Each light shall be plainly marked as to the manufacturer's name and model number.

If required by the Resident, certification as to conformance to these specifications shall be furnished based on results of tests made by an independent testing laboratory. All lights are subject to random inspection and testing. All necessary random samples shall be provided to the Resident upon request without cost to the Department. All such samples shall be returned to the Contractor upon completion of the tests.

712.32 Copper Tubing Copper tubing and fittings shall conform to the requirements of ASTM B88M Type A [ASTM B88, Type K] or better.

712.33 Non-metallic Pipe, Flexible Non-metallic pipe and pipe fittings shall be acceptable flexible pipe manufactured from virgin polyethylene polymer suitable for transmitting liquids intended for human or animal consumption.

712.34 Non-metallic Pipe, Rigid Non-metallic pipe shall be Schedule 40 polyvinylchloride (PVC) that meets the requirement of ASTM D1785. Fittings shall be of the same material.

712.341 Metallic Pipe Metallic pipe shall be ANSI, Standard B36.10, Schedule 40 steel pipe conforming to the requirements of ASTM A53 Types E or S, Grade B. End plates shall be steel conforming to ASTM A36/A36M.

Both the sleeve and end plates shall be hot dip galvanized. Pipe sleeve splices shall be welded splices with full penetration weld before galvanizing.

712.35 Epoxy Resin Epoxy resin for grouting or sealing shall consist of a mineral filled thixotropic, flexible epoxy resin having a pot life of approximately one hour at 10°C [50°F]. The grout shall be an approved product suitable for cementing steel dowels into the preformed holes of curb inlets and adjacent curbing. The sealant shall be an approved product, light gray in color and suitable for coating the surface.

712.36 Bituminous Curb The asphalt cement for bituminous curb shall be of the grade required for the wearing course, or shall be Viscosity Grade AC-20 meeting the current requirements of Subsection 702.01 Asphalt Cement. The aggregate shall conform to the requirements of Subsection 703.07. The coarse aggregate portion retained on the 2.36 mm [No. 8] sieve may be either crushed rock or crushed gravel.

The mineral constituents of the bituminous mixture shall be sized and graded and combined in a composite blend that will produce a stable durable curbing with an acceptable texture.

Bituminous material for curb shall meet the requirements of Section 403 - Hot Bituminous Pavement.

712.37 Precast Concrete Slab Portland cement concrete for precast slabs shall meet the requirements of Section 502 - Structural Concrete, Class A.

The slabs shall be precast to the dimension shown on the plans and cross section and in accordance with the Standard Detail plans for Concrete Sidewalk Slab. The surface shall be finished with a float finish in accordance with Subsection 502.14(c). Lift devices of sufficient strength to hold the slab while suspended from cables shall be cast into the top or back of the slab.

712.38 Stone Slab Stone slabs shall be of granite from an acceptable source, hard, durable, predominantly gray in color, free from seams which impair the structural integrity and be of smooth splitting character. Natural color variations characteristic of the deposit will be permitted. Exposed surfaces shall be free from drill holes or indications of drill holes. The granite slabs in any one section of backslope must be all the same finish.

The granite slabs shall be scabble dressed or sawed to an approximately true plane having no projections or depressions over 13 mm [½ in] under a 600 mm [2 ft] straightedge or over 25 mm [1 in] under a 1200 mm [4 ft] straightedge. The arris at the intersection of the top surface and exposed front face shall be pitched so that the arris line is uniform throughout the length of the installed slabs. The sides shall be square to the exposed face unless the slabs are to be set on a radius or other special condition which requires that the joints be cut to fit, but in any case shall be so finished that when the stones are placed side by side no space more than 20 mm [¾ in] shall show in the joint for the full exposed height.

Liftpin holes in all sides will be allowed except on the exposed face.

SECTION 717 ROADSIDE IMPROVEMENT MATERIAL

717.05 Mulch Binder. Change the third sentence to read as follows:

“Paper fiber mulch may be used as a binder at the rate of 2.3 kg/unit [5 lb/unit].”

SPECIAL PROVISION
SECTION 635

Timber Lagging Wall

Description: This work shall consist of the fabrication and installation of a timber lagging wall built to the lines and grades shown on the project plan and wall detail sheets. The contractor shall supply materials for and install backfill and timber lagging between piles for the soldier pile and lagging earth retention system in accordance with these specifications.

Materials: Materials shall meet the following requirements:

Granular backfill shall meet the requirements of Subsection 706.03 Aggregate for Base and Subbase, Type D.

Timber Lagging shall consist of 100 mm X 300 mm No. 2 Southern Pine or better

$F_b = 6720 \text{ kPa (975 psi)}$

$E = 11030 \text{ MPa (1,600,000 psi)}$

Treatment: AWWPA

Water-borne Chromated Copper Arsenate with 9.61 kg/m^3 (0.6 pcf) retention

Certification: Contractor shall certify through suppliers that all component materials, manufacturing operations, and/or furnished products conform to all requirements of Maine Department of Transportation pertinent to project plans, special provisions and specifications for contract item or items indicated.

Construction Requirements: Excavation for erection of the timber lagging wall shall be in accordance with Section 203 Excavation and Embankment. Excavation shall be to a sufficient width and depth to allow leveling and embedment of the first course of timber lagging as shown on the wall Detail and Notes Sheet. Lagging shall be installed edge to edge to prevent soil loss, and to the elevation shown on the Detail and Notes Sheet.

Before backfilling operations begin, the contractor shall grub the area between the wall and the existing edge of pavement. Granular backfill shall be placed in 200 mm (8 inch) maximum thickness lifts (loose measure) and compacted to at least 90 percent of the maximum dry density as determined in accordance with AASHTO T-180 method C or D. Backfill shall be placed and compacted on a 2:1 (H:V) slope up to a level 75 mm (3 inches) below the top of the wall.

When backfilling is complete, loam and seed all areas disturbed by construction above and below the wall. The contractor shall place 75 mm (3 inches) of loam over all areas disturbed by construction and seed in accordance with Sections 615 Loam, and 618 Seeding, Method No. 3.

Method of Measurement: Timber lagging wall shall be measured by the square meter (square foot) of front face, including the embedded course.

PIN 12036.00

Greenbush

June 3, 2003

Basis of Payment: Timber Lagging Wall will be paid for at the contract unit price per square meter (square foot) complete and accepted in-place. Payment shall be full compensation for furnishing all labor, equipment, materials, and incidentals necessary to construct the timber lagging wall. Excavation, backfill, CCA treatment, loam and seed, debris removal, shall all be incidental to timber lagging wall.

Pay Item:

Pay Unit

635.20 Timber Lagging Wall

square meter (square foot)

SPECIAL PROVISION
SECTION 652
MAINTENANCE OF TRAFFIC

Approaches. Approach signing shall include the following signs shown on the Standard Maintenance Traffic in Construction Zones for "Project Approach Signing-Two Way Traffic".

Road Work Ahead
Road Work 1000 Feet
Road Work 500 Feet

Work Areas. At each work site, signs and channelizing devices as shown on the Standard Maintenance of Traffic in Construction Zones shall be used as directed by the Resident.

Signs include:

Work Zone
Speed Limit Plate
Work Area Ahead with 25 MPH Advisory Speed Plate
Work Area Ahead
One Lane Road Ahead
Flagger Sign
Trucks Entering

The above lists of Approach signs and Work Area signs are representative of the contract requirements. Other sign legends may be required.

The Contractor shall provide a minimum roadway width of 7 m [22 feet] for two way traffic whenever possible, and 3.5 m [11 feet] for one way traffic. Two way traffic operation shall be provided at all times the Contractor is not working on the project. One way traffic shall be controlled through work areas by Flaggers. Flaggers equipped with radios, field telephones or other means of direct communication shall be used to control one way traffic.

Channelization. Channelization devices shall include the following:

Temporary Concrete Barrier
Drums
Cones

Channelization devices shall be installed and maintained at the spacing determined by the MUTCD through the work area.

Channelizing devices consisting of drums or cones at a maximum spacing of 15 m [50 feet] shall be used in guardrail areas when neither the existing guardrail nor the new guardrail is in place.

Roadside Recovery Area. The Contractor shall not store material nor park equipment outside of the temporary concrete barrier. Equipment parked overnight within 8m [25ft] of the edge of the travel lane shall be clearly marked by channelizing devices or other reflective devices.

**SPECIAL PROVISION
SECTION 656**

Temporary Soil Erosion and Water Pollution Control

The following is added to Section 656 regarding Project Specific Information and Requirements. All references to the Maine Department of Transportation Best Management Practices for Erosion and Sediment Control (a.k.a. Best Management Practices manual or BMP Manual) are a reference to the latest revision of said manual. The "Table of Contents" of the latest version is dated "1/19/00" (available at <http://www.state.me.us/mdot/mainhtml/bmp/bmpjan2000.pdf>.)

Procedures specified shall be according to the BMP Manual unless stated otherwise.

Delete the last sentence of Section 656.4.4, which reads, "After Final Acceptance of the project, the Contractor must submit the log to the Department which will become the property of the Department."

Any and all references to "bark mulch" or "composted bark mix" shall be a reference to "Erosion Control Mix" in accordance with *Standard Specification, Section 619 - Mulch*.

Project Specific Information and Requirements

The following information and requirements apply specifically to this Project. The temporary soil erosion and water pollution control measures associated with this work shall be addressed in the SEWPCP.

- 1) This project is in the Penobscot River watershed, which is listed as an Outstanding River Segment downstream of this area and is considered **SENSITIVE** in accordance with the BMP Manual. The Contractor's SEWPCP shall comply with Section II.B., Guidelines for Sensitive Waterbodies in the BMP Manual.
- 2) Newly disturbed earth shall be mulched by the end of each workday. Mulch shall be maintained on a daily basis.
- 3) Permanent slope stabilization measures shall be applied within one week of the last soil disturbance.
- 4) Permanent seeding shall be done in accordance with *Standard Specification, Section 618 - Seeding* unless the Contract states otherwise.
- 5) Dust control items other than those under *Standard Specification, Section 637 - Dust Control*, if applicable, shall be included in the plan.

Permits & Cultural Resources Unit

PIN #: 10236.00 Location: Greenbush

Permit Member: Rhonda Poirier

Photographs ☐

Database/Projex ☒

Package to ENV Coordinator: 12/6/02

☒ HISTORIC AND CULTURAL RESOURCES

MHPC Historic Resources

N/A ☐ Applicable ☒

Approved ☒

MHPC Archeological Resources

N/A ☐ Applicable ☒

Approved ☒

Tribal Consultation

N/A ☐ Applicable ☒

Approved ☒

☒ 4(f) and 6(f)

Section 4(f)

N/A ☒ Applicable ☐

Approved ☐

LAWCON 6(f)

N/A ☒ Applicable ☐

Approved ☐

☒ Maine Department of Environmental Protection (MDEP) Site Location of Development

N/A ☒ Applicable ☐

Approved ☐

☒ Local Zoning, Title 30-A, Section 4325-6.

Is the project something other than the highway and bridge system, such as a maintenance lot, building/parking facility? Yes

☐ No ☒ If no, the project is exempt.

If yes, continue. Does the town in which the project is located have a comprehensive plan consistent with the Growth Management Program? Yes ☐ No ☐ If no, the project is exempt.

If yes, local zoning ordinances and/or permits are needed.

Approved ☐

☒ Maine Department of Inland Fisheries and Wildlife (MDIFW) Essential Habitat

Eagle Nest

N/A ☒ Applicable ☐

Approved ☐

Piping Plover

N/A ☒ Applicable ☐

Approved ☐

Roseate Tern

N/A ☒ Applicable ☐

Approved ☐

☒ United States Fish and Wildlife Service (USFWS), Migratory Bird Act

N/A ☒ Applicable ☐

Approved ☐

☒ Environmental Protection Agency (EPA), National Pollutant Discharge Elimination System (NPDES)

N/A ☒ Applicable ☐

NOI Submitted ☐

☒ Land Use Regulation Commission (LURC) ☒ Not Applicable

No permit ☐

Notice ☐

Approved ☐

Permit ☐

Approved ☐

☒ Maine Department of Environmental Protection (MDEP), Natural Resource Protection Act

No permit required ☒

Exempt ☐

(Must use erosion and sediment control and not block fish passage.)

PBR ☐

Approved ☐

Tier 1 ☐

Approved ☐

Tier 2 ☐

Approved ☐

Tier 3 ☐

Approved ☐

☒ Army Corps of Engineers (ACOE), Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act.

No permit required ☒

Category 1-NR ☐

Approved ☐

Category 2 ☐

Approved ☐

Category 3 ☐

Approved ☐

☒ IN-WATER TIMING RESTRICTIONS: N/A ☒ ☐ 105 Special Provision ☐ No instream timing restrictions

Dates instream work is allowed:

☒ Special Provision 656, Erosion Control Plan (provided by Water Resources)

* Boxes marked in red indicate items that are attached and need to be placed in the contract by the Project Manager.

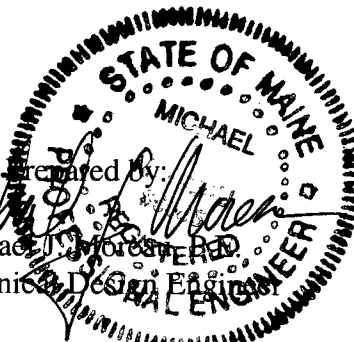
Maine Department of Transportation

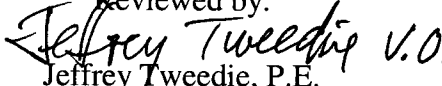
Highway Geotechnical Section

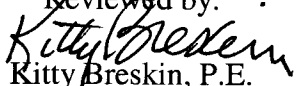
Report of

GEOTECHNICAL ENGINEERING EVALUATION
for
SOLDIER PILE AND LAGGING EARTH RETENTION SYSTEM
ROUTE 2, GREENBUSH, PENOBSCOT COUNTY

Prepared by:

Michael J. Mores, P.E.
Geotechnical Design Engineer


Reviewed by:

Jeffrey Tweedie, P.E.
Geotechnical Design Engineer

Reviewed by:

Kitty Breskin, P.E.
Geotechnical Design Engineer

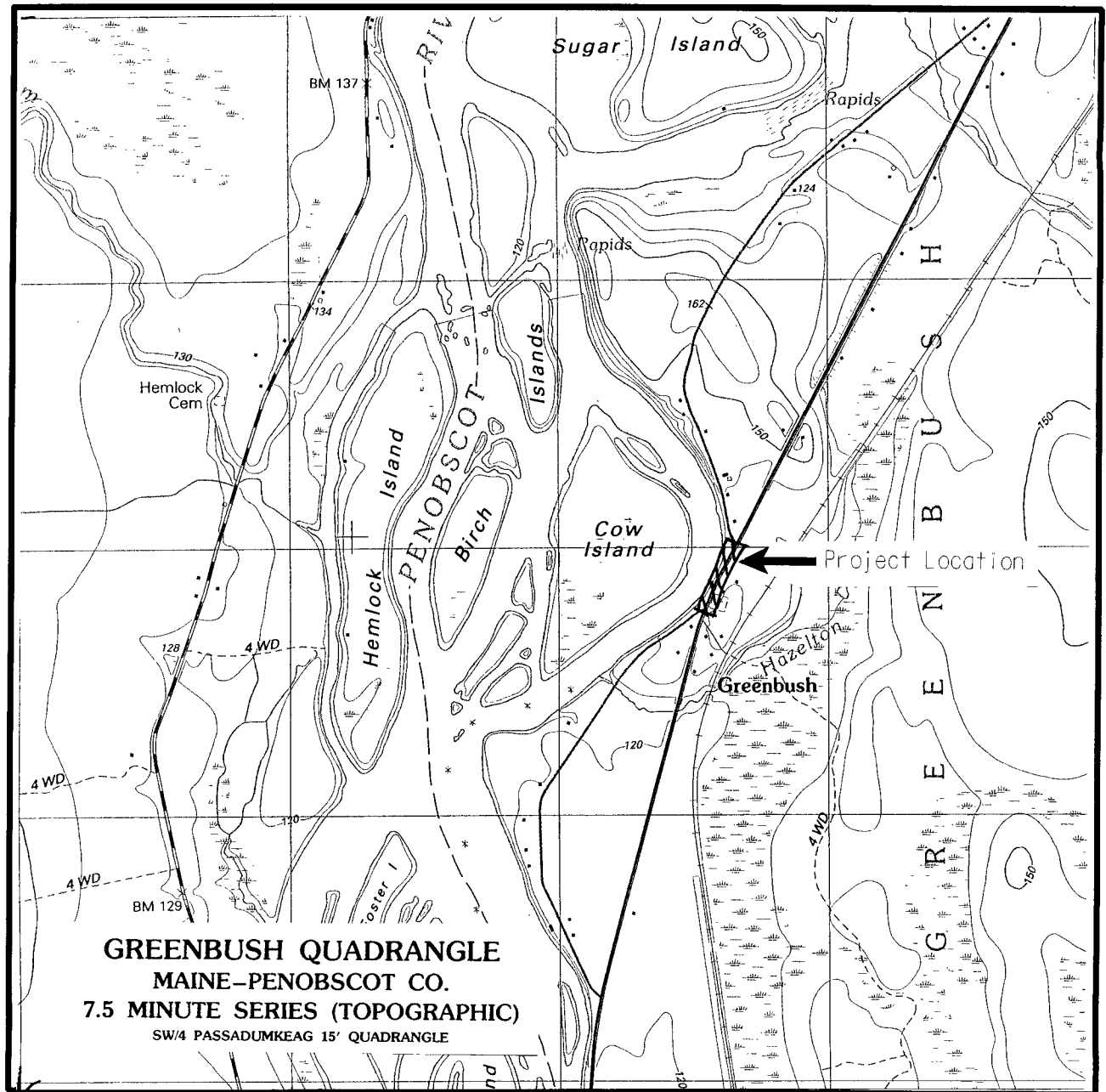
Penobscot County

PIN 12036.00
Federal Number STP-1203(600)X

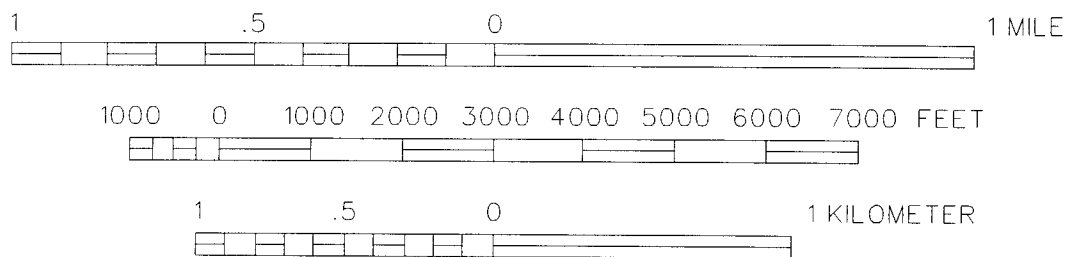
Soils Report 2003-28

May 2003

Location Map



Greenbush, Maine, Route 2 Slope Failure, PIN. 12036.00



1:24000, 1" = 2000', 1 cm = 240 m

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Project Plan Sheets
Detail and Notes Sheet

Appendix - B Field Exploration and Test Data

Appendix - C Laboratory Test Data

Appendix - D Calculations

1.0 GEOTECHNICAL DESIGN SUMMARY

Slope movements occurred several years ago adjacent to Route 2 between the Lower Middle Road and Middle River Road in Greenbush, Maine. The slope movements have left a portion of Route 2 vulnerable to slope failure. The Maine Department of Transportation (MDOT) has designed a soldier pile and lagging earth retention system to protect the highway in event of additional slope movements in this area.

We recommend the following:

- Construct an earth retention system approximately 130 m long consisting of a soldier pile and lagging retaining wall between STA. 1+120 LT and 1+250 LT as shown on the Project Plan Sheets and Detail and Notes Sheet in Appendix - A, Figures.
- Use W 360 X 148 (14 X 99) or HP 360 X 152 (14 X 102) ASTM A572M Grade 345 MPa (50 ksi) rolled steel piles.
- Drive the piles to bedrock. The contractor must perform, and provide for approval, a wave equation analysis considering the proposed driving equipment. The contractor must limit pile driving stresses to allowable levels of less than $0.9 F_y$.
- Install the piles at 1.8 m (6 ft) center-to-center spacing on a line 4.6 m (15 ft) beyond the existing guard rail.
- Cut the piles off at elevation 40.3 m (132.2 ft), or the ground surface, whichever is higher.
- Use 100 mm X 300 mm (4 in X 12 in) southern pine lagging treated with chromated copper arsenate (9.61 kg/m^3 retention); Install the wood lagging between the piles from approximate STA 1+173 to 1+220 and backfill up to elevation 40.3 m (132.2 ft). The intent is to create a 2:1 (H:V) slope beginning at existing ground elevation behind the guardrail down to the top of the pile and lagging wall. Piles driven flush with the ground will be left in place for future use.
- Where lagging is installed, grub the ground surface uphill from the wall to the edge of pavement and backfill with granular soil consisting of MDOT Standard Specification 703.06 Type D aggregate. The contractor should place backfill in 200 mm (8-inch) maximum thickness lifts and compact the backfill to at least 90 % of the Modified Proctor maximum dry density. Loam and seed all areas disturbed by construction above and below the wall in accordance with MDOT Standard Specification Section 615 Loam, and Section 618 Seeding Method No. 3.
- The project requires relocation of overhead utilities which is currently underway.
- The contractor should use MDOT Best Management Practices to minimize erosion of fine-grained soils found along the project.

These recommendations are discussed in greater detail in Section 4.0, Evaluation and Recommendations.

2.0 INTRODUCTION

In May 2002, a significant slope failure occurred between the Middle River Road and the Penobscot River in Greenbush, Maine. Middle River Road is an old section of Route 2 reverted back to the Town of Greenbush in the 40's or 50's. The Middle River Road failure is not the subject of this report. However, this failure is exemplary of the erosion forces at work along this segment of the Penobscot River and we were consulted to review the conditions of that failure and render an opinion for the town. That failure also brought attention to slope movements observed along Route 2, about ¼ mile south of the Middle River Road failure, which we evaluated and discuss in detail in this report.

The Middle River Road failure is located about 76 m (250 ft) from the western side of Route 2. In mid-May 2002, the initial slope failure left a terrace and scarp about 1.5 to 1.8 m (5 or 6 ft) high, approximately 61 m (200 ft) along and 3 m (10 ft) deep (laterally) into the slope, taking part of Middle River Road. The town tried to repair the scarp by placing fill over the terrace created by the scarp. Then in late May 2002, a section of the slope about 30 m (100 ft) long failed completely under the weight of the new fill. Survey measurements performed between the time of the initial slough and the complete failure, show that the Middle River Road centerline did not change substantially, and has remained virtually unchanged to date.

Mike Moreau, P.E., MDOT geotechnical engineer, conducted an inspection of the Middle River Road slope failure site in June 2002. Based on observations made at the site, we determined that the likely slope failure mechanism was long-term slope toe erosion by the adjacent Penobscot River. A geotechnical investigation of the slope failure performed for the town by FGS/CMT, Inc., in Bangor, Maine, made similar findings (FGS/CMT, Inc., 2002).

As mentioned above, the slope failure along the Middle River Road brought attention to slope movements observed along a portion of Route 2 about 0.4 km (¼-mi) south of the Middle River Road failure. Significant slope movements occurred at this location several years ago, but the slope reportedly has not moved since. The scarp created by that slough is now about 0.9 m (3 ft) high at its tallest point. The head of the scarp parallels, and is immediately behind, the guard rail section for a distance of about 21 m (70 ft) and spreads to about 46 m (150 ft) at the toe along the Penobscot River. This section of arterial is clearly vulnerable to a significant future slope failure. This report discusses the site and subsurface conditions, summarizes our evaluation, and presents our recommendations for a soldier pile and lagging earth retention system.

3.0 SITE AND SUBSURFACE CONDITIONS

The slopes along the western flank of Route 2 in the project area grade steeply down from Route 2 to the Penobscot River and grades rise gently east of Route 2. The highway was approximately 10 m (33 ft) above the river elevation at the time of our investigation in July 2002. Towards the

river, the slope steepness ranges from 2:1 to 1½:1 (H:V). There is a vertical scarp immediately behind the guard rail for a distance of about 21 m (70 ft) approximately between STA 1+175 and 1+197. The scarp ranges in height from about 0.5 m (1½ ft) to 0.9 m (3 ft). There is a prominent soil bulge along the river at the lower end of the fan-shaped slough area along the Penobscot River. During our field investigation, we observed a clay-silt plume at the toe of the slope, evidence of on-going erosion. Land use within the corridor is primarily rural residential. However, there are no buildings or improvements other than an overhead utility line between Route 2 and the Penobscot River along this site.

Surficial geology maps of the region indicate that the predominant soils are glaciomarine sand and clay-silt deposits of the Presumpscot Formation and glacial till. Glaciomarine deposits typically consist of clayey silt, but sand is abundant at the surface in some locations. Glacial till deposits are typically a heterogeneous mixture of sand, silt, clay, and stones. The native clay-silt and glacial till soils within the project area are both poorly drained, highly erodible, and highly frost susceptible.

Our field investigation consisted of three wash borings and two hand borings conducted in June and July 2002. The boring locations are shown on the attached Project Plan Sheets in Appendix - A, Figures. In the wash borings we found three principal soil units (Fill, Marine Deposits with silty sand and clay-silt subunits, and Glacial Till) and apparent bedrock. We encountered fill soils in the upper 2.4 to 3 m (8 to 10 ft). The fill was underlain by 2.4 to 4.9 m (8 to 16 ft) of stratified silty fine sand and clay-silt, followed by 6.4 to 11.0 m (21 to 36 ft) of clay-silt. The clay-silt was underlain by 1.5 to 3.7 m (5 to 12 ft) of glacial till which we observed over bedrock. In the hand borings we found sand and gravel fill soils.

We observed ground water at a depth ranging between about 2.4 and 2.7 m (8 and 9 ft) in the wash borings. We did not observe any free water in the hand borings. However, the groundwater level will fluctuate with seasonal changes, runoff, and adjacent construction activities. For a more detailed description of the subsurface conditions, please refer to the boring logs in Appendix - B, Field Exploration and Test Data.

We subjected specific soil samples collected in the boring explorations to a number of laboratory index tests, including water content, grain size analysis, and Atterberg limits. We present the results of the laboratory testing in Appendix - C, Laboratory Test Data. Summary lab data can also be found on the boring logs in Appendix - B, Field Exploration and Test Data.

4.0 EVALUATION AND RECOMENDATIONS

4.1 Design Evaluation

The site is underlain by Presumpscot Formation glaciomarine sediments consisting of fine sands clays and silts. The characteristics of the underlying soils at this site are consistent with geotechnical characteristics of Presumpscot Formation sediments found at other sites. Measured water contents within the grey marine clay-silt subunit ranged from approximately 27 to 41

percent. The natural water content of some portions of the clay was close to or above the liquid limit (liquidity index near or above 1). Thus, we would consider these portions of the marine clay subunit to be moderately sensitive to sensitive. This means we would expect the clay to experience strength loss upon remolding. Field vane shear tests in the marine clay-silt confirm this with peak to remolded shear strength ratios ranging between approximately 3 to 6. This soil unit also exhibits slight to medium plasticity. We measured the undrained shear strength of the marine clay-silt with field vane shear equipment ranging between approximately 34 and 59 kPa (710 and 1230 psf).

We attribute the recent slope sloughing to the natural erosion forces presented by the Penobscot River. A geotechnical investigation of the slope failure along Middle River Road to the north made similar findings for that site (FGS/CMT, Inc., 2002). River levels may rise as much as 3 meters (10 feet) in this area as evidenced by a debris line visible in the trees and brush along the riverbank during our June 2002 field investigations. We observed on-going erosion in the form of a clay-silt plume during our site investigations. As the slope toe is eroded, the loss of soil weight reduces the slope's natural buttressing force, allowing the upper slope soil weight to drive a shear failure. Consequently, the soil begins to shear at depth and move downhill.

The erosion process can be expected to continue over time. One method to reduce riverbank erosion and increase the resisting forces is to build a buttress fill using heavy rip rap. However, this method is not practical for this site since it would require in-stream work and the river is relatively deep in this area (± 3 m, 10 ft). There is also no easy way to determine where to start and end the riverbank protection since erosion forces due to a bend in the river are present along a long segment of the river here. Consequently, protecting the highway embankment using a soldier pile and lagging earth retention system is the best alternative.

We designed the soldier pile and lagging wall considering the present slough area and the potential for future slope sloughing. We considered embankment fill thickness and configuration, native soil types and their orientation, and the present scarp height. Thus, we designed the earth retention system to accommodate a 4.5 m (15 ft) high cantilever wall extending approximately 50 m (165 ft) north and south of the existing slough area. We did not consider traffic surcharge loading since the travel lanes are approximately 7 m (23 ft) away from the planned wall location. We considered ground water forces in the lower two thirds of the wall.

There are numerous overhead utility lines along a pole line traversing the slope. The project requires relocation of these overhead utilities which is currently underway.

4.2 Earth Retention System Construction Recommendations

Based on our analysis of the site conditions and assumed potential future sloughing conditions, we recommend constructing an earth retention system approximately 130 m (425 ft) long

consisting of a soldier pile and lagging retaining wall. Only a short central section of the wall will require lagging at the present time. We recommend installing the piles at 1.8 m (6 ft) center-to-center spacing on a line 4.6 m (15 ft) beyond the existing guard rail. The piles should be installed between approximate STA. 1+120 LT and 1+250 LT as shown on the Project Plan Sheets and Detail and Notes Sheet in Appendix - A, Figures.

We recommend using W 360 X 148 (14 X 99) or HP 360 X 152 (14 X 102) rolled steel piles driven to bedrock. Piles should consist of ASTM A572M, Grade 50 steel, with minimum yield stress, F_y , of 345 MPa (50 ksi). The contractor must perform, and provide for approval, a wave equation analysis considering the proposed driving equipment. The contractor must limit pile driving stresses to allowable levels of less than $0.9 F_y$. We recommend that the contractor cut the piles off at elevation 40.3 m (132.2 ft), or the existing ground surface, whichever is higher. This will provide piles for future support as needed and limit the amount of lagging required for the current project. The 40.3 m (132.2 ft) elevation will facilitate creation of a 2:1 (H:V) slope adjacent to the highway when backfilling is complete.

We recommend using 100 mm X 300mm (4 in X 12 in) southern pine lagging. The first course of lagging should be embedded about 1 foot below the exterior finish grade. The contractor should install the wood lagging between the piles from approximate STA 1+173 to 1+220 and backfill up to elevation 40.3 m (132.2 ft). The intent is to create a 2:1 (H:V) slope beginning at existing ground elevation behind the guardrail down to the pile and lagging wall. Piles driven flush with the ground will be left in place for future use. The lagging will be in permanent contact with the backfill soil. Consequently, we recommend using southern pine lagging treated with chromated copper arsenate.

We recommend backfilling the pile and lagging wall with granular fill consisting of MDOT Standard Specification 703.06, Type D aggregate. Before backfilling, we recommend that the contractor grub the ground surface between the top of the wall and the existing edge of pavement. The contractor should then place backfill in 8-inch maximum thickness lifts and compact it to at least 90% of the Modified Proctor maximum dry density (AASHTO T-180). After backfilling, we recommend that the contractor loam and seed all areas disturbed by construction above and below the earth retention system. Loam and seed should be in accordance with MDOT Standard Specification Section 615 Loam, and Section 618 Seeding Method No. 3.

4.3 Erosion Control Recommendations

The fine-grained soils along the project are susceptible to erosion. We recommend using appropriate erosion control measures during construction as described in the MDOT Best Management Practices guidelines.

REFERENCES

FGS/CMT, Inc., (2002), "Evaluation of Middle River Road Landslide, Greenbush, Maine,"
Consultant report prepared for the Town of Greenbush by FGS/CMT, Inc. Bangor,
Maine, June.

APPENDIX - A

Figures

Project Plan Sheets (SEPARATE)

Detail and Notes Sheet (SEPARATE)

APPENDIX - B

Field Exploration and Test Data

Maine Department of Transportation				Project: GREENBUSH RTE 2 RETAINING WALL		Boring No.: HB-GBSH-101	
Soil/Rock Exploration Log US UNITS				Location: ROUTE 2, GREENBUSH		PIN: 12036.00	
Driller: MAINE TEST BORING		Elevation (ft.): 138.4 (42.19 m)		Auger ID/OD:			
Operator: MEL COFFIN		Datum: NGVD		Sampler: STD SPOONS/VANES			
Logged By: MIKE MOREAU		Rig Type: MOBILE B50		Hammer Wt./Fall: 140#/30"			
Date Start/Finish: 7/1/02-7/2/02		Drilling Method: CASED WASH BORING		Core Barrel: N/A			
Boring Location: STA 1+186.3 4.3 (m) LT		Casing ID/OD: NW 3"		Water Level*: 8.5 FT.			
Definitions: D = Split Spoon Sample MD = Unsuccessful Split Spoon Sample attempt U = Thin Wall Tube Sample R = Rock Core Sample V = Insitu Vane Shear Test SSA = Solid Stem Auger				Definitions: S _u = Insitu Field Vane Shear Strength (psf) T _v = Pocket Torvane Shear Strength (psf) q _p = Unconfined Compressive Strength (ksf) S _{u(lab)} = Lab Vane Shear Strength (psf) WOH = weight of 140lb. hammer WQR = weight of rods			
Definitions: WC = water content, percent LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = Consolidation Test							

Depth (ft.)	Sample Information							Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (6 in.) Shear Strength (psf) or ROD (%)	N-value	Casing Blows					
0	S1	18/12	0.3 - 1.8	11/30/29	59	SSA	138.1		PAVEMENT.	G128067 A-1-a, SW-SM WC=2.2%	
									Brown, very dense, damp, fine to coarse sandy GRAVEL with trace silt, occasional cobbles, (FILL).		
6	S2	18/18	5.0 - 6.5	13/20/62	82	32	133.0			Brown, very dense, moist, fine to coarse SAND with little gravel, some silt (FILL).	G128068 A-2-4, SM WC=11.3%
						90	132.2				
						55				Brown and black, very dense, moist, fine to coarse SAND with some gravel, trace to some silt, occasional cobbles, (FILL).	
						33	129.9				
						17				Stratified brown, very loose to medium dense, wet, silty SAND, and soft to stiff fine sandy SILT, layers 1/4" to 2" thick, (GLACIOMARINE). Silty fine sand is dilatant.	
	S3	18/10	10.0 - 11.5	6/6/8	14	12				Vane attempted at 10.2 Ft., but in stratified sand and silt.	G128069 A-4, ML WC=25.9%
						13					
12											
						21					
						32					
						27					
	S4	18/8	15.0 - 16.5	7/7/2	9	17				Vane attempted at 15.2 Ft., but in stratified sand and silt.	
						13				Changed to grey at 16.2 Ft.	
18											
						16					
						17					
						19					
	S5	18/18	20.0 - 21.5	1/2/1	3	21				Vane attempted at 20 Ft., but hit sand seam.	128071 WC=30%
						19					
						18					
						17					
24							114.4				
						15			Grey, wet, soft to stiff, CLAY-SILT with trace fine sand, less prominent silty fine sand, layers up to 1" thick, (GLACIOMARINE).	G128070 A-4, CL WC=31.2% LL=30 PL=22 PI=8	
	S6	18/18	25.0 - 26.5	1/2/1	3	23					
						15					
						6/10					
	V1			> 1215 psf *		18			65 x 130 mm Vane. * Possible sand seam. V1: >60 Nm		
30						14					

Remarks:

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

 * Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Page 1 of 2

Boring No.: HB-GBSH-101

Maine Department of Transportation				Project: GREENBUSH RTE 2 RETAINING WALL		Boring No.: HB-GBSH-101					
Soil/Rock Exploration Log US UNITS				Location: ROUTE 2, GREENBUSH		PIN: 12036.00					
Driller: MAINE TEST BORING		Elevation (ft.) 138.4 (42.19 m)		Auger ID/OD:							
Operator: MEL COFFIN		Datum: NGVD		Sampler: STD SPOONS/VANES							
Logged By: MIKE MOREAU		Rig Type: MOBILE B50		Hammer Wt./Fall: 140#/30"							
Date Start/Finish: 7/1/02-7/2/02		Drilling Method: CASSED WASH BORING		Core Barrel: N/A							
Boring Location: STA 1+186.3 4.3 (m) LT		Casing ID/OD: NW 3"		Water Level*: 8.5 FT.							
Definitions: D = Split Spoon Sample MD = Unsuccessful Split Spoon Sample attempt U = Thin Wall Tube Sample R = Rock Core Sample V = Insitu Vane Shear Test SSA = Solid Stem Auger				Definitions: S _u = Insitu Field Vane Shear Strength (psf) T _v = Pocket Torvane Shear Strength (psf) q _p = Unconfined Compressive Strength (ksf) S _u (lab) = Lab Vane Shear Strength (psf) WOH = weight of 140lb. hammer WOR = weight of rods		Definitions: WC = water content, percent LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = Consolidation Test					
Depth (ft.)	Sample Information							Visual Description and Remarks	Laboratory Testing Results/AASHTO and Unified Class.		
	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)				
30	S7	18/15	30.0 - 31.5	PUSH THRU VANE		19			Grey, wet, soft to stiff, clay SILT with trace fine sand, less prominent silty fine sand, layers up to 1" thick, (GLACIOMARINE). Occasional silty fine SAND seams, 1-2 mm thick after 30 Ft. 55 x 110 mm Vane. V2: 24.5/7.8 Nm V3: 37.5/10.7 Nm	128072 WC=31.4%	
	V2			Su=806/257 psf		13					
	V3			Su=1234/352 psf		16					
						15					
						15					
36	S8	18/18	35.0 - 36.5	PUSH THRU VANE		14				55 x 110 mm Vane. V4: 24.2/5.5 Nm V5: 23.7/5.5 Nm	G128073 A-7-6, CL WC=41.4% LL=41 PL=23 PI=18
	V4			Su=797/181 psf		16					
	V5			Su=780/181 psf		16					
						13					
						13					
42	S9	18/18	40.0 - 41.5	PUSH THRU VANE		13				55 x 110 mm Vane. V6: 21.3/4.5 Nm V7: 23.8/4.3 Nm	128074 WC=40.5%
	V6			Su=701/148 psf		10					
	V7			Su=783/142 psf		13					
						12				Attempted vane at 45 Ft., but could not advance more than 0.2 Ft.	G98926 A-2-4, SM WC=8.7%
						12					
	S10	18/10	45.0 - 46.5	17/60/25	85	53	93.2				
						104					
						128					
48						87		Attempted to wash ahead, but hole caved, drove casing to 55 Ft.	G98927 A-1-b, GM WC=7.8%		
						89					
	S11	18/6	50.0 - 51.5	30/25/23	48	51					
						28					
						39					
54						51		Refusal on spoon at 56.4 Ft. Weathered Rock in spoon. Advance casing to refusal on apparent bedrock at 56.3 Ft. Roller Cone apparent weathered rock from 56.3 to 56.8 Ft. Boring terminated in apparent weathered Bedrock at 56.8 Ft. Bottom of Exploration at 56.8 feet below ground surface.			
						70					
	S12	17/8	55.0 - 56.4	26/34/100(0.4')	---	76					
						50/3 RC	82.1				
						81.6					
60											
Remarks: 											
Stratification lines represent approximate boundaries between soil types; transitions may be gradual.								Page 2 of 2 Boring No.: HB-GBSH-101			

Maine Department of Transportation				Project: GREENBUSH RTE 2 RETAINING WALL		Boring No.: HB-GBSH-102	
Soil/Rock Exploration Log US UNITS				Location: ROUTE 2, GREENBUSH		PIN: 12036.00	
Driller: MAINE TEST BORING		Elevation (ft.) 137.8 (42.01 m)		Auger ID/OD: 6 1/2"			
Operator: MEL COFFIN		Datum: NGVD		Sampler: STANDARD SPLIT SPOON			
Logged By: MIKE MOREAU		Rig Type: MOBILE B50		Hammer Wt./Fall: 140#/30"			
Date Start/Finish: 7/2/02-7/3/02		Drilling Method: HOLLOW STEM AUGER		Core Barrel: N/A			
Boring Location: STA 1+243.1 4.6 (m) LT		Casing ID/OD: N/A		Water Level*: ~8 FT.			
Definitions: D = Split Spoon Sample MD = Unsuccessful Split Spoon Sample attempt U = Thin Wall Tube Sample R = Rock Core Sample V = Insitu Vane Shear Test SSA = Solid Stem Auger				Definitions: S _u = Insitu Field Vane Shear Strength (psf) T _v = Pocket Torvane Shear Strength (psf) q _p = Unconfined Compressive Strength (ksf) S _{u(lab)} = Lab Vane Shear Strength (psf) WOH = weight of 140lb. hammer WOR = weight of rods			
				Definitions: WC = water content, percent LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = Consolidation Test			
Sample Information							
Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)
0	S1	18/12	0.5 - 2.0	17/26/24	50	HSA	137.5
							133.8
6	S2	18/15	5.0 - 6.5	32/26/28	54		
							127.3
12	S3	18/12	10.0 - 11.5	4/1/2	3		
							123.8
	S4	18/6	15.0 - 16.5	WOH/2/5	7		
18							119.8
	S5	18/14	20.0 - 21.5	2/3/5	8		
24							112.3
	S6	18/15	25.0 - 26.5	1/3/5	8		
30							
Visual Description and Remarks							
PAVEMENT.							
Brown, very dense, damp, fine to coarse SANDY GRAVEL with trace silt, occasional cobbles, (FILL).							
Changed to brown and grey, (old highway?) and trace to little silt.							
Grey-brown, wet, soft, fine sandy SILT, trace coarse sand, manganese stains, (GLACIOMARINE).							
Grey, wet, medium stiff, CLAY-SILT with trace fine sand, occasional silty fine sand seams < 1 mm thick, (GLACIOMARINE).							
Stratified wet medium stiff clay-silt and loose silty fine sand after 18 ft., grey silty fine sand layers more prominent after 18 ft and up to 1.5 in. thick (GLACIOMARINE).							
Grey, soft to medium stiff, wet, CLAY-SILT with trace fine sand, occasional silty fine sand seams 1-3 mm thick, (GLACIOMARINE), silty fine sand layers are dilatant.							
Laboratory Testing Results/ AASHTO and Unified Class. 98928 WC=26.8% 98929 WC=28.5%							
Remarks:							
Stratification lines represent approximate boundaries between soil types; transitions may be gradual.							
* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.							

Maine Department of Transportation						Project: GREENBUSH RTE 2 RETAINING WALL		Boring No.: HB-GBSH-102		
<u>Soil/Rock Exploration Log</u> US UNITS						Location: ROUTE 2, GREENBUSH		PIN: 12036.00		
Driller: MAINE TEST BORING			Elevation (ft.): 137.8 (42.01 m)			Auger ID/OD: 6 1/2"				
Operator: MEL COFFIN			Datum: NGVD			Sampler: STANDARD SPLIT SPOON				
Logged By: MIKE MOREAU			Rig Type: MOBILE B50			Hammer Wt./Fall: 140#/30"				
Date Start/Finish: 7/2/02-7/3/02			Drilling Method: HOLLOW STEM AUGER			Core Barrel: N/A				
Boring Location: STA 1+243.1 4.6 (m) LT			Casing ID/OD: N/A			Water Level*: -8 FT.				
Definitions: D = Split Spoon Sample MD = Unsuccessful Split Spoon Sample attempt U = Thin Wall Tube Sample R = Rock Core Sample V = Insitu Vane Shear Test SSA = Solid Stem Auger						Definitions: S_u = Insitu Field Vane Shear Strength (psf) T_v = Pocket Torvane Shear Strength (psf) q_p = Unconfined Compressive Strength (ksf) $S_{u(lab)}$ = Lab Vane Shear Strength (psf) WOH = weight of 140lb. hammer WOR = weight of rods			Definitions: WC = water content, percent LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = Consolidation Test	
Sample Information									Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log		
30	S7	18/18	30.0 - 31.5	2/2/4	6	HSA			Grey, soft to medium stiff, wet, CLAY-SILT with trace fine sand, occasional silty fine sand seams 1-3 mm thick, (GLACIOMARINE), silty fine sand layers are dilatant.	G98930 A-4, CL-ML WC=26.0% LL=28 PL=22 PI=6
36	S8	18/17	35.0 - 36.5	2/2/4	6					98931 WC=28.8%
42	S9	18/18	40.0 - 41.5	1/2/2	4					G98932 A-7-6, CL WC=38.8% LL=43 PL=13 PI=20
48	S10	18/18	45.0 - 46.5	WOH/2/3	5				Black manganese staining after 45 Ft.	98933 WC=35.1%
54	S11	18/6	50.0 - 51.5	5/6/8	14				Grey, medium dense, wet, silty fine to coarse SAND with little gravel, occasional cobbles, (GLACIAL TILL).	G98934 A-4, SM WC=10.8%
	MD	2/0	52.5 - 52.7	50/0.1'	---				Drill attitude indicates weathered rock at 54.6 Ft. Spoon attempted but refused at 55.1 ft. Boring Terminated At 55.1 FT. In Apparent Weathered Rock.	
							83.2		Apparent Weathered ROCK at 54.6 to 55.1 Ft.	
							82.7		Bottom of Exploration at 55.1 feet below ground surface.	
Remarks:										
Stratification lines represent approximate boundaries between soil types; transitions may be gradual.										
Page 2 of 2										
Boring No.: HB-GBSH-102										

Maine Department of Transportation Soil/Rock Exploration Log US UNITS				Project: GREENBUSH RTE 2 RETAINING WALL Location: ROUTE 2, GREENBUSH				Boring No.: HB-GBSH-103 PIN: 12036.00							
Driller: MAINE TEST BORING				Elevation (ft.) 138.6 (42.24 m)				Auger ID/OD: 6 1/2"							
Operator: MEL COFFIN				Datum: NGVD				Sampler: STANDARD SPLIT SPOON							
Logged By: MIKE MOREAU				Rig Type: MOBILE B50				Hammer Wt./Fall: 140#/30"							
Date Start/Finish: 7/3/02-7/3/02				Drilling Method: HOLLOW STEM AUGER				Core Barrel: N/A							
Boring Location: STA 1+130.6 4.0 (m) LT				Casing ID/OD: N/A				Water Level*: ~8 FT.							
Definitions: D = Split Spoon Sample MD = Unsuccessful Split Spoon Sample attempt U = Thin Wall Tube Sample R = Rock Core Sample V = Insitu Vane Shear Test SSA = Solid Stem Auger				Definitions: S _u = Insitu Field Vane Shear Strength (psf) T _v = Pocket Torvane Shear Strength (psf) q _p = Unconfined Compressive Strength (ksf) S _{u(lab)} = Lab Vane Shear Strength (psf) WOH = weight of 140lb. hammer WOR = weight of rods				Definitions: WC = water content, percent LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = Consolidation Test							
Sample Information												Visual Description and Remarks		Laboratory Testing Results/ AASHTO and Unified Class.	
Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log							
0	S1	18/12?	0.5 - 2.0	24/22/28	50	HSA	138.3		0.3	Brown, loose to very dense, damp, fine to coarse SANDY GRAVEL with trace silt, occasional cobbles, (FILL).	98935 WC=28.1%				
6	S2	18/12?	5.0 - 6.5	4/4/2	6		130.6		8.0			Brown, loose to medium dense silty fine SAND (GLACIOMARINE).			
12	MD	18/0	10.0 - 11.5	5/5/6	11							Unsuccessful sample attempt at 10.0-11.5'.			
18	S3	18/18?	15.0 - 16.5	2/2/2	4		123.1		15.5			Grey, very soft to soft, wet, CLAY-SILT with trace fine sand, occasional silty fine sand seams and layers, (GLACIOMARINE).			
24	S4	18/18?	20.0 - 21.5	1/1/1	2										
30	S5	18/18?	25.0 - 26.5	1/WOR/WOR	0						98936 WC=32.2%				
											98937 A-4, CL-ML WC=29.3% LL=25 PL=18 PI=7				
Remarks:															
Stratification lines represent approximate boundaries between soil types; transitions may be gradual.												Page 1 of 2			
* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.												Boring No.: HB-GBSH-103			

Maine Department of Transportation				Project: GREENBUSH RTE 2 RETAINING WALL		Boring No.: HB-GBSH-103		
Soil/Rock Exploration Log US UNITS				Location: ROUTE 2, GREENBUSH		PIN: 12036.00		
Driller: MAINE TEST BORING		Elevation (ft.) 138.6 (42.24 m)		Auger ID/OD: 6 1/2"				
Operator: MEL COFFIN		Datum: NGVD		Sampler: STANDARD SPLIT SPOON				
Logged By: MIKE MOREAU		Rig Type: MOBILE B50		Hammer Wt./Fall: 140#/30"				
Date Start/Finish: 7/3/02-7/3/02		Drilling Method: HOLLOW STEM AUGER		Core Barrel: N/A				
Boring Location: STA 1+130.6 4.0 (m) LT		Casing ID/OD: N/A		Water Level*: ~8 FT.				
Definitions: D = Split Spoon Sample MD = Unsuccessful Split Spoon Sample attempt U = Thin Wall Tube Sample R = Rock Core Sample V = Insitu Vane Shear Test SSA = Solid Stem Auger				Definitions: S _u = Insitu Field Vane Shear Strength (psf) T _v = Pocket Torvane Shear Strength (psf) q _p = Unconfined Compressive Strength (ksf) S _{u(lab)} = Lab Vane Shear Strength (psf) WOH = weight of 140lb. hammer WOR = weight of rods		Definitions: WC = water content, percent LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = Consolidation Test		
Sample Information								
Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log
30						HSA		
36	S6	18/18?	35.0 - 36.5	WOH/WOH/WOH	0			
42								
48	S7	18/18?	45.0 - 46.5	WOH/WOH/WOH	0			
54	S8	5/3	55.0 - 55.4	50/0.4'	---		83.2	
60								
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Visual Description and Remarks</p> <p>Grey, very soft to soft, wet, CLAY-SILT with trace fine sand, occasional silty fine sand seams and layers, (GLACIOMARINE).</p> <p>Grey, dense, wet, gravelly fine to coarse SAND with little to some silt, occasional cobbles, (GLACIAL TILL).</p> <p>Refusal On Spoon On Apparent Bedrock at 55.4 Ft. Boring Terminated At 55.4 Ft. On Apparent Bedrock.</p> <p>Bottom of Exploration at 55.4 feet below ground surface.</p> </div> <div style="width: 45%; text-align: right;"> <p>Laboratory Testing Results/ AASHTO and Unified Class.</p> <p>98938 WC=36.3%</p> <p>98939 A-6, CL WC=40.8% LL=32 PL=22 PI=10</p> </div> </div>								
Remarks:								
Stratification lines represent approximate boundaries between soil types; transitions may be gradual.								

Maine Department of Transportation				Project: GREENBUSH RTE 2 RETAINING WALL		Boring No.: HB-1					
Soil/Rock Exploration Log US UNITS				Location: ROUTE 2, GREENBUSH		PIN: 12036.00					
Driller:		Elevation (ft.)		127.79 (38.95 m)		Auger ID/OD:		3 1/2"			
Operator:		Datum:		NGVD		Sampler:					
Logged By: MIKE MOREAU		Rig Type:				Hammer Wt./Fall:					
Date Start/Finish: 6/21/02		Drilling Method:		HAND AUGER BORING		Core Barrel:					
Boring Location: STA 1+191.7 12.4 (m) LT		Casing ID/OD:				Water Level*:		NONE OBSERVED			
Definitions: D = Split Spoon Sample MD = Unsuccessful Split Spoon Sample attempt U = Thin Wall Tube Sample R = Rock Core Sample V = Insitu Vane Shear Test SSA = Solid Stem Auger				Definitions: S _u = Insitu Field Vane Shear Strength (psf) T _v = Pocket Torvane Shear Strength (psf) q _p = Unconfined Compressive Strength (ksf) S _u (lab) = Lab Vane Shear Strength (psf) WOH = weight of 140lb. hammer WOR = weight of rods				Definitions: WC = water content, percent LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = Consolidation Test			
Sample Information											
Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows /6 in. Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.	
0						Hand Auger	123.3		Brown, damp, fine to coarse SAND and GRAVEL with trace to some silt, minor organics in top 1-inch, (FILL). Asphalt covered aggregate at 2.8 Ft, possible old pavement? Hole caving due to coarse gravel and cobbles at 4.5 Ft. Cannot advance boring. Boring terminated at 4.5 Ft. No Refusal Bottom of Exploration at 4.5 feet below ground surface.		
6											
12											
18											
24											
30											
Remarks:											
Stratification lines represent approximate boundaries between soil types; transitions may be gradual.											
Page 1 of 1											
Boring No.: HB-1											

Maine Department of Transportation Soil/Rock Exploration Log US UNITS				Project: GREENBUSH RTE 2 RETAINING WALL Location: ROUTE 2, GREENBUSH				Boring No.: HB-2 PIN: 12036.00							
Driller:				Elevation (ft.) 112.1 (34.17 m)				Auger ID/OD: 3 1/2"							
Operator:				Datum: NGVD				Sampler:							
Logged By: MIKE MOREAU				Rig Type:				Hammer Wt./Fall:							
Date Start/Finish: 6/21/02				Drilling Method: HAND AUGER BORING				Core Barrel:							
Boring Location: STA 1+192.7 22.5 (m) LT				Casing ID/OD:				Water Level*: NONE OBSERVED							
Definitions: D = Split Spoon Sample MD = Unsuccessful Split Spoon Sample attempt U = Thin Wall Tube Sample R = Rock Core Sample V = Insitu Vane Shear Test SSA = Solid Stem Auger				Definitions: S _u = Insitu Field Vane Shear Strength (psf) T _v = Pocket Torvane Shear Strength (psf) q _p = Unconfined Compressive Strength (ksf) S _u (lab) = Lab Vane Shear Strength (psf) WOH = weight of 140lb. hammer WOR = weight of rods				Definitions: WC = water content, percent LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = Consolidation Test							
Sample Information												Visual Description and Remarks		Laboratory Testing Results/ AASHTO and Unified Class.	
Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log							
0						Hand Auger	110.8		Brown, damp, fine to coarse sandy GRAVEL with trace silt, minor organics in top 1-inch, (FILL). Cannot advance boring through gravel. Boring terminated at 1.3 Ft. No Refusal. Bottom of Exploration at 1.3 feet below ground surface.			1.3			
6															
12															
18															
24															
30															
Remarks:															
Stratification lines represent approximate boundaries between soil types; transitions may be gradual.												Page 1 of 1			
* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.												Boring No.: HB-2			

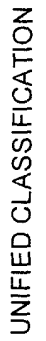
APPENDIX - C

Laboratory Test Data

Project Number: 12036.00

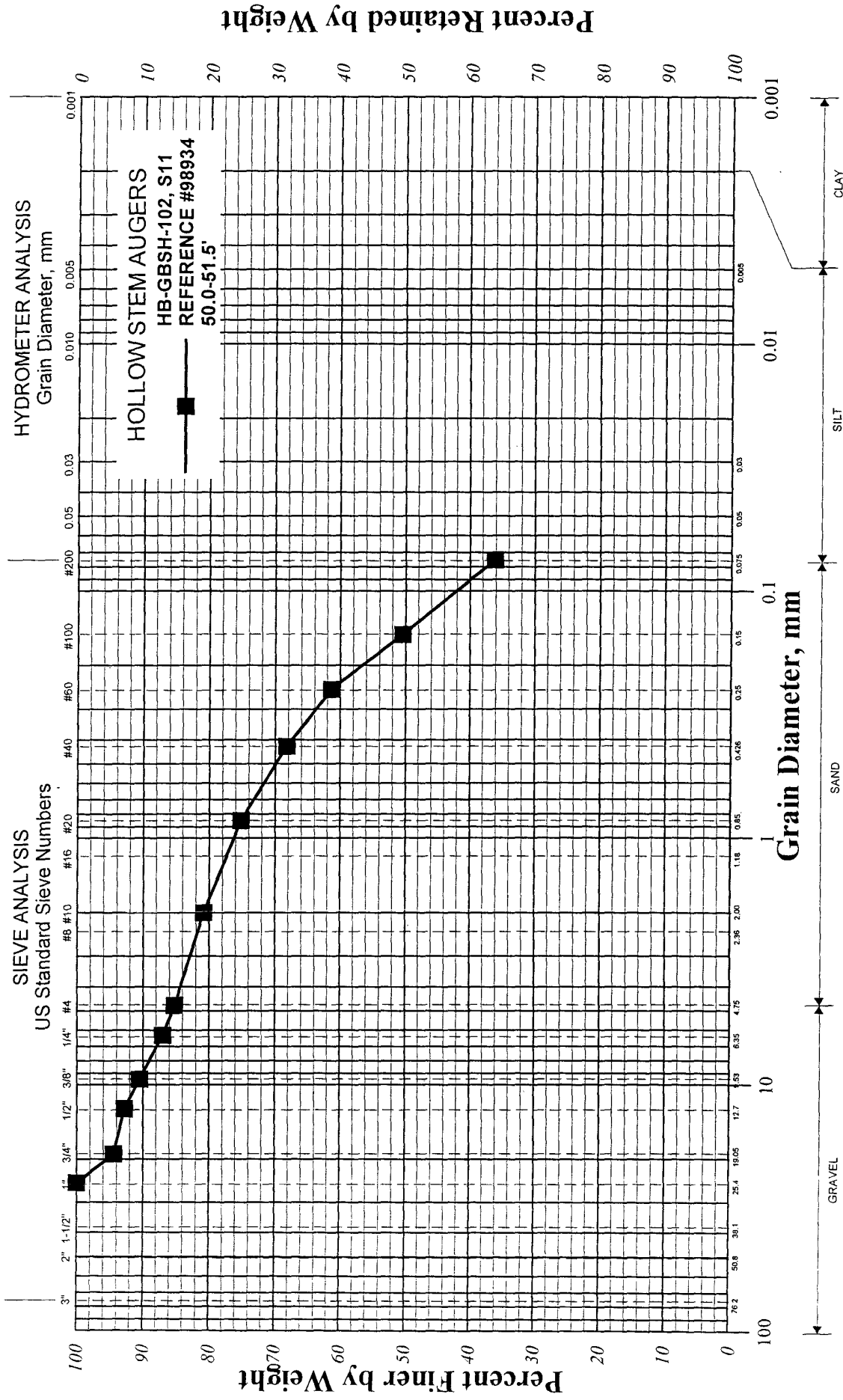
Classification of these soil samples is in accordance with AASHTO Classification System M-145-40. This classification is followed by the "Frost Susceptibility Rating" from zero (non-frost susceptible) to Class IV (highly frost susceptible). The "Frost Susceptibility Rating" is based upon the MDOT and Corps of Engineers Classification Systems.

PI = Plasticity Index as determined by AASHTO 90-96 and/or ASTM D4318-98



PIN: 12036.00
Town: Greenbush, Slope Failure

State of Maine Department of Transportation
GRAIN SIZE DISTRIBUTION CURVE



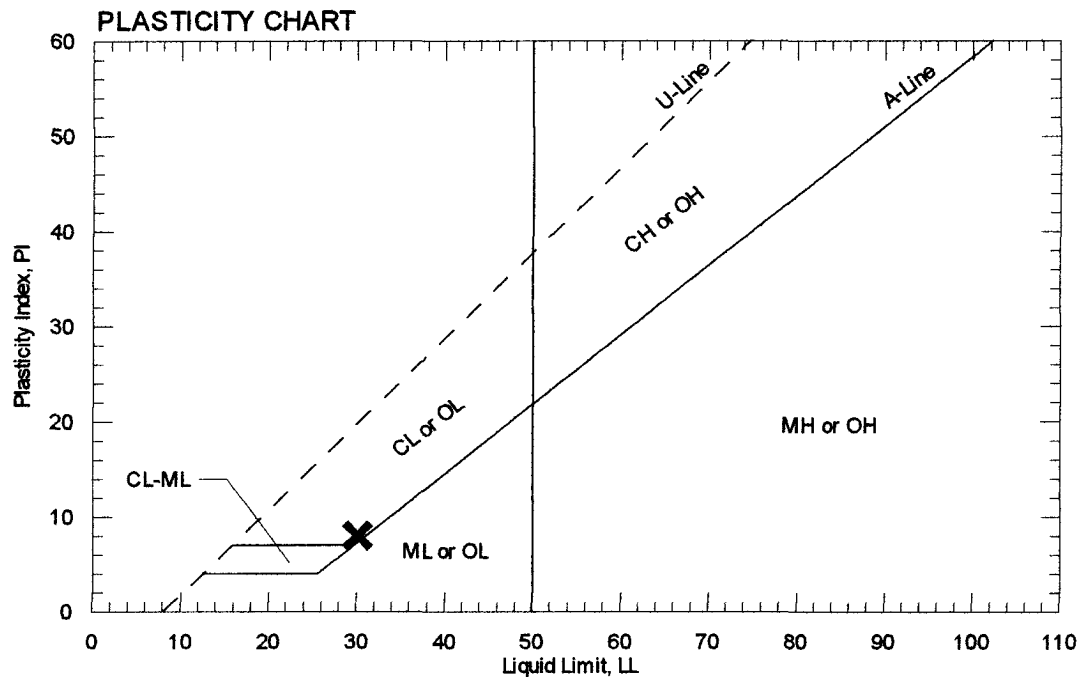
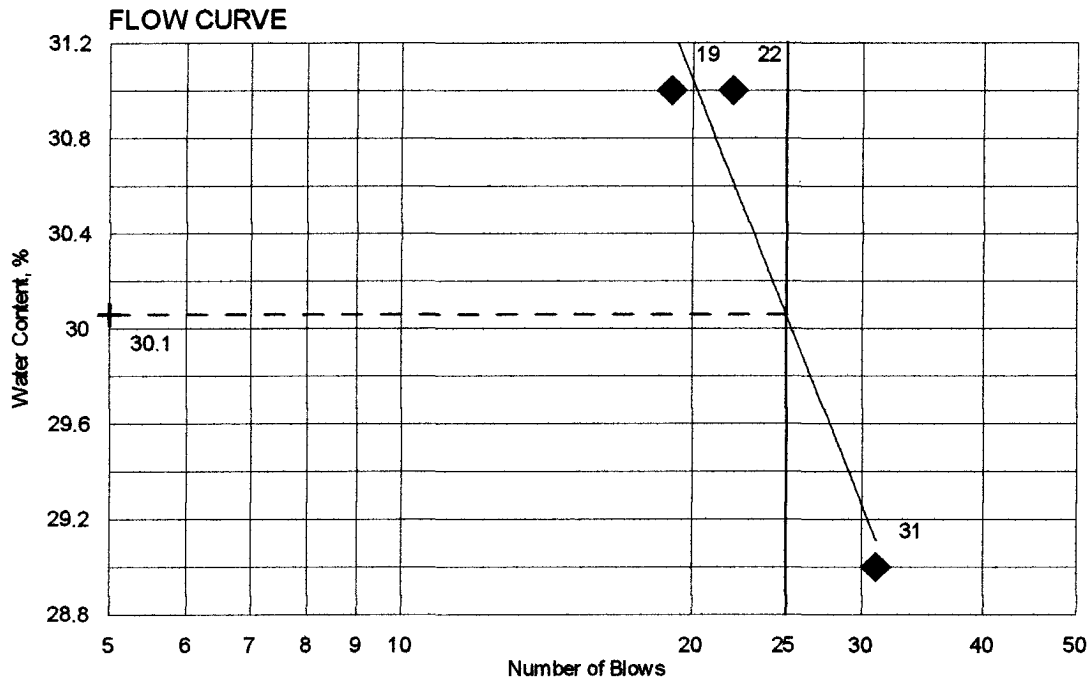
Percent Retained by Weight

UNIFIED CLASSIFICATION

PIN: 12036.00
 Town: Greenbush, Slope Failure
 Reported by: T.White
 Date: 7/15/02

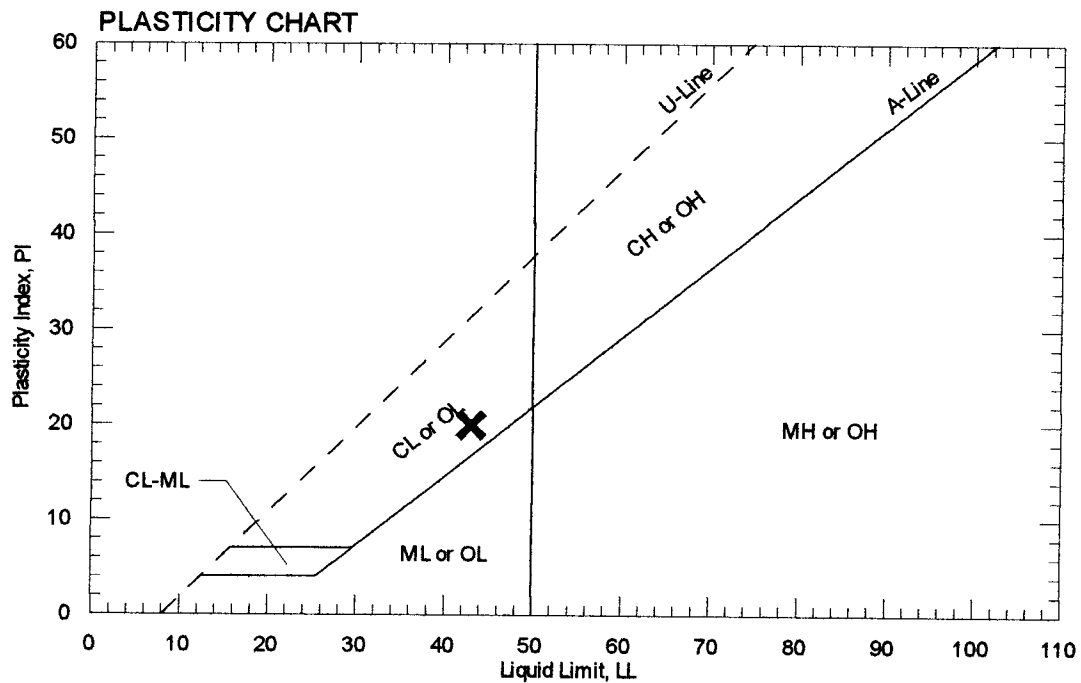
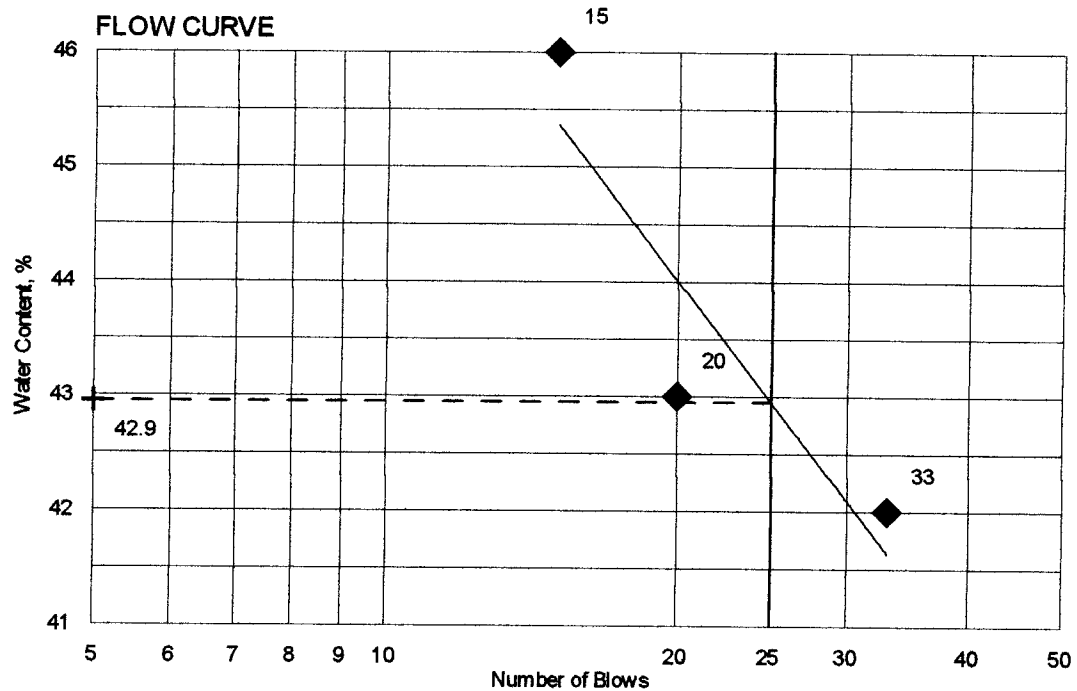
**State of Maine-Department of Transportation
Atterberg Limits Test Summary Sheet**

TOWN	Greenbush	Reference No.	128070
PIN	10519.4	Water content (%)	31
Date	1/17/2003	Plastic limit (%)	22
Boring No.	HB-GBSH-101	Liquid limit (%)	30.1
Station		Plasticity index (%)	8.1
Depth/Sample No.	25-26.5'	Reported by	KLD



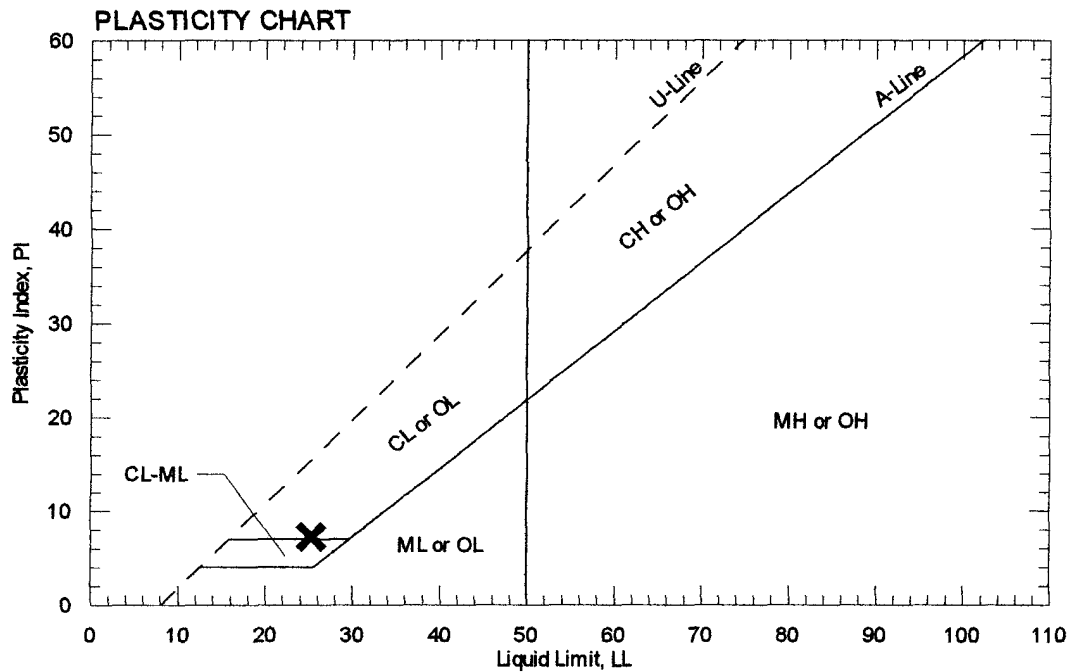
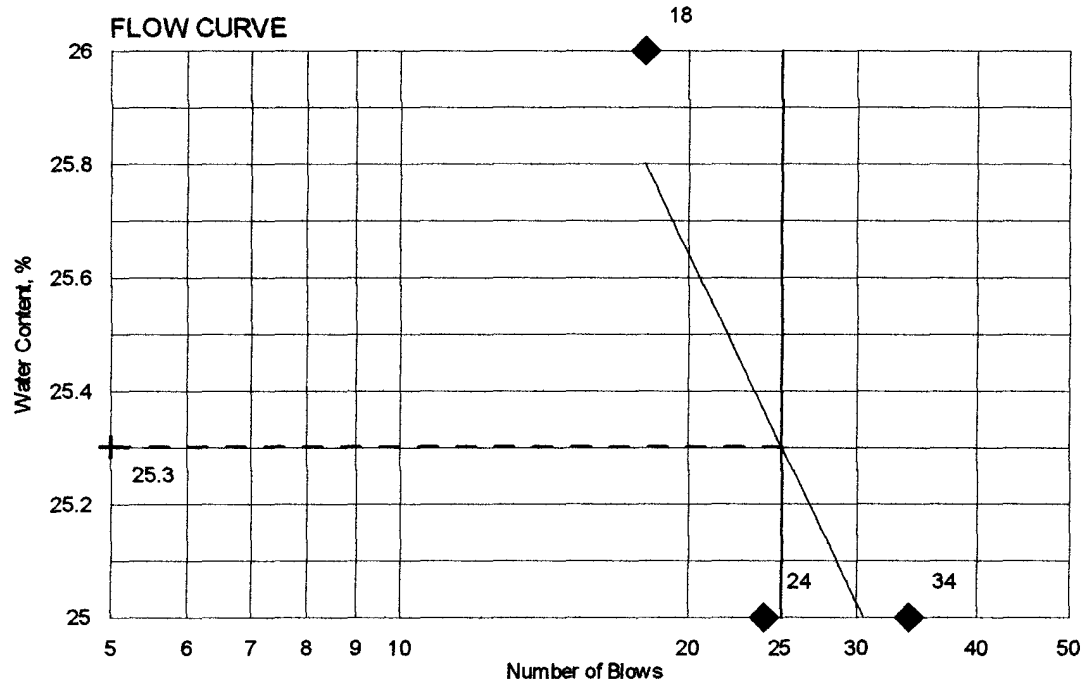
**State of Maine-Department of Transportation
Atterberg Limits Test Summary Sheet**

TOWN	Greenbush	Reference No.	98932
PIN	10519.4	Water content (%)	38.8
Date	7/22/2002	Plastic limit (%)	23
Boring No.	HB-GBSH-102	Liquid limit (%)	42.9
Station		Plasticity index (%)	19.9
Depth/Sample No.	40.0-41.5/S9	Reported by	Brian Fogg



**State of Maine-Department of Transportation
Atterberg Limits Test Summary Sheet**

TOWN	Greenbush	Reference No.	98937
PIN	10519.4	Water content (%)	29.3
Date	1/22/2003	Plastic limit (%)	18
Boring No.	HB-GBSH-103	Liquid limit (%)	25.3
Station		Plasticity index (%)	7.3
Depth/Sample No.	25-26.5	Reported by	KLD



PRELIM. BY M. MOREAU DATE 10/17/62 PROJ. NO. 12030 FILE NO. _____ OF _____
 FINAL CHK. BY _____ DATE _____ LOCATION ROUTE 2, GREENBUSH SH. NO. _____ OF _____
 ITEM NO. _____ SUBJECT EARTH RETENTION SYSTEM

HB-101, 102, 103
 Avg. Soil
 Profile

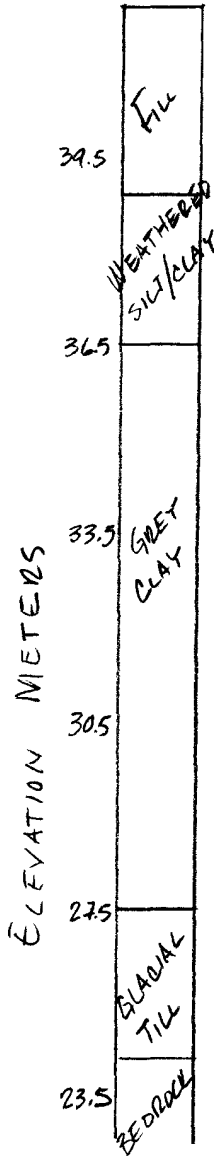
ATTERBERG
 LIMITS

$W_L, W_p, W_u, \%$
 10 20 30 40 50

FIELD VANE
 SHEAR STRENGTH

$S_v, L_P (HB-101)$

0 10 20 30 40 50 60



○ ○

○₁₀
 ○ ○

○ ○

○ ○ ○

○ ○

○ ○

Plastic Limit Natural Water Content Liquid Limit

△

△

△

△ △

△ △

APPENDIX - D

Calculations

SOLDIER PILE AND LAGGING WALL DESIGN

Granular Soil Over Cohesive Soil Case

Reference Pile Buck Steel Sheet Piling Design Manual pp 42 - 50

Definition of units

$$\begin{aligned} \text{psf} &:= \frac{\text{lbf}}{\text{ft}^2} & \text{pcf} &:= \frac{\text{lbf}}{\text{ft}^3} & \text{Mg} &:= 1000 \cdot \text{kg} & \text{kN} &:= 1000 \cdot \text{newton} & \text{kPa} &:= \frac{\text{kN}}{\text{m}^2} & \text{ton} &:= 2000 \cdot \text{lbf} & \text{tsf} &:= \frac{\text{ton}}{\text{ft}^2} \\ \text{kip} &:= 1000 \cdot \text{lbf} & \text{ksf} &:= \frac{\text{kip}}{\text{ft}^2} & \text{MPa} &:= 1000 \cdot \text{kPa} & \text{ksi} &:= \frac{\text{kip}}{\text{in}^2} & \text{plf} &:= \frac{\text{lbf}}{\text{ft}} & \text{ftlb} &:= \text{lbf} \cdot \text{ft} \end{aligned}$$

$$P_{p1} - P_{a1} = 2q_u - \gamma H = 4c - \gamma' H$$

$$P_{p2} - P_{a2} = 2q_u + \gamma H = 4c + \gamma' H$$

$$\gamma := 125 \text{ pcf} \quad \gamma' := 125 \text{ pcf} - 60 \text{ pcf} \quad \gamma' = 65 \text{ pcf}$$

$$K_a := 0.33 \quad \gamma_w := 62.4 \text{ pcf} \quad H := 15 \text{ ft}$$

$$\text{@ } 5 \text{ FT, } \sigma'_a = K_a \cdot \gamma \cdot 5 \text{ ft} = 206.25 \text{ psf}$$

$$\text{@ } 15 \text{ FT, } \sigma'_a = K_a \cdot (\gamma \cdot 5 \text{ ft} + \gamma' \cdot 10 \text{ ft}) = 420.75 \text{ psf}$$

$$u = \gamma_w \cdot 10 \text{ ft} = 624 \text{ psf}$$

Calculate $P_a = A_1 + A_2 + A_3 + A_4$

$$A_1 := 0.5 \cdot 5 \text{ ft} \cdot 207 \text{ psf}$$

$$A_1 = 517.5 \text{ plf}$$

$$A_2 := 10 \text{ ft} \cdot 207 \text{ psf}$$

$$A_2 = 2.07 \cdot 10^3 \text{ plf}$$

$$A_3 := 0.5 \cdot 10 \text{ ft} \cdot (421 - 207) \text{ psf}$$

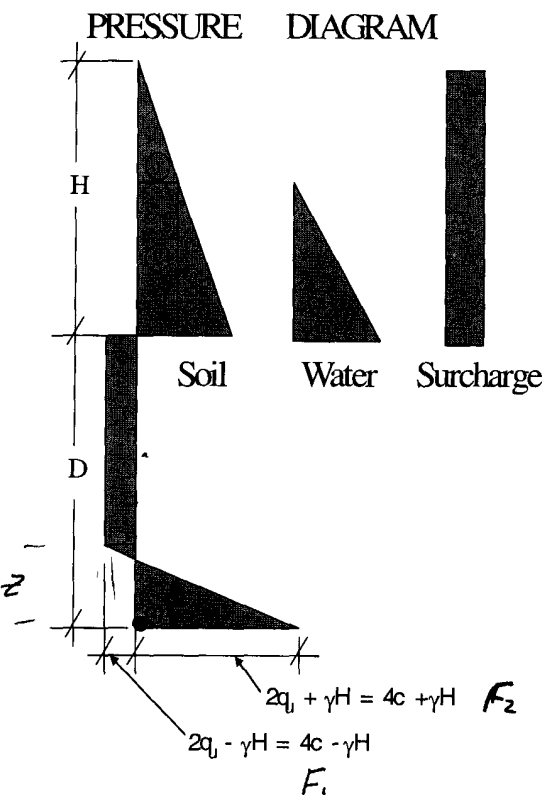
$$A_3 = 1.07 \cdot 10^3 \text{ plf}$$

$$A_4 := (0.5 \cdot 10 \text{ ft} \cdot 624) \text{ psf}$$

$$A_4 = 3.12 \cdot 10^3 \text{ plf}$$

$$P_a := A_1 + A_2 + A_3 + A_4$$

$$P_a = 6.777 \cdot 10^3 \text{ plf}$$



per foot
width

w/o Surcharge

Calculate P_{surchage}

$$P_{\text{surchage}} := 250 \text{ psf} \cdot 15 \text{ ft} \cdot K_a \cdot 0 \quad P_{\text{surchage}} = 0 \text{ plf}$$

NOTE: Travel lanes too far to consider surcharge load

Calculate $\sum F_H = 0$ General Equation:

$$1/2(\gamma H - 2c)(H - H_o) + 1/2(8c)(z) + P_{\text{surchage}} - (4c - \gamma' H)D = 0$$

For Granular Over Cohesive Soil Condition, Substitute $1/2(K_a \gamma' H)H$ For $1/2(\gamma H - 2c)(H - H_o)$

Note: $1/2(K_a \gamma' H)H$ is P_a

$$\text{Also } 1/2(8c)(z) = 1/2[(4c - \gamma' H) + (4c + \gamma' H)](z).$$

Substitute Reduced Values For $(4c - \gamma' H)$ And $(4c + \gamma' H)$ Based On Soldier Pile Spacing

$$\text{SO } \sum F_H = 0 = P_a + 1/2[(4c - \gamma' H) + (4c + \gamma' H)](z) + P_{\text{surchage}} - (4c - \gamma' H)D$$

Calculate $\sum M_o = 0$ General Equation:

$$1/2(\gamma H - 2c)(H - H_o)[D + (H/3)] + (8cz^2)/6 + P_{\text{surchage}}(D+H/2) - (4c - \gamma' H)(D^2/2) = 0$$

For Granular Over Cohesive Soil Condition, Substitute $1/2(K_a \gamma' H)H$ For $1/2(\gamma H - 2c)(H - H_o)$

Note: $1/2(K_a \gamma' H)H$ is P_a which acts at the following height Y above the "dredge line":

$$Y := \frac{\left[A_1 \cdot \left(10 + \frac{5}{3} \right) \text{ ft} + A_2 \cdot \left(\frac{10}{2} \right) \text{ ft} + A_3 \cdot \left(\frac{10}{3} \right) \text{ ft} + A_4 \cdot \left(\frac{10}{3} \right) \text{ ft} \right]}{(A_1 + A_2 + A_3 + A_4)}$$

$$Y = 4.479 \text{ ft}$$

$$\text{Also } (8cz^2)/6 = 1/2[(4c - \gamma' H) + (4c + \gamma' H)](z)(z/3).$$

Substitute Reduced Values For $(4c - \gamma' H)$ And $(4c + \gamma' H)$ Based On Soldier Pile Spacing

$$\text{SO } \sum M_o = 0 = P_a [D + Y] + 1/2[(4c - \gamma' H) + (4c + \gamma' H)](z)(z/3) + P_{\text{surchage}}(D+H/2) - (4c - \gamma' H)D^2/2$$

Calculate $4c - \gamma'H$ and $4c + \gamma'H$

Assume 14-inch Soldier Piles and Each Pile Contributes 2.5b Support Width \Rightarrow ^{3.0} 2.5 ft
Assume 6-foot Pile Spacing, So Divide $4c \pm \gamma'H$ By 2 _{OK}

$$c := 800 \text{ psf} \quad \gamma'H := (\gamma \cdot 5 \text{ ft} + \gamma' \cdot 10 \text{ ft}) \quad \gamma'H = 1.275 \cdot 10^3 \text{ psf}$$

$$\gamma'H := \gamma \cdot 15 \text{ ft} \quad \gamma'H = 1.875 \cdot 10^3 \text{ psf}$$

NOTE: Use $\gamma'H$ or $\gamma'H$
depending on project conditions

$$F_1 := \frac{(4c - \gamma'H)}{2} \quad F_1 = 962.5 \text{ psf}$$

$$F_2 := \frac{(4c + \gamma'H)}{2} \quad F_2 = 2.237 \cdot 10^3 \text{ psf}$$

Given

$$\checkmark P_a + 0.5 \cdot (F_1 + F_2) \cdot z + P_{\text{surchage}} - F_1 \cdot D = 0$$

Note: This is $\Sigma F_H = 0$

$$\checkmark P_a \cdot (D + Y) + 0.5 \cdot (F_1 + F_2) \cdot \frac{z^2}{3} + P_{\text{surchage}} \cdot \left(D + \frac{15 \text{ ft}}{2}\right) - F_1 \cdot \frac{D^2}{2} = 0$$

Note: This is $\Sigma M_O = 0$

$$\text{Find}(z, D) \rightarrow \begin{cases} -4.2359375000000000000 \cdot \text{ft} + .1203125000000000000 \cdot \left(\frac{2711}{77} + \frac{8128}{4722666666666666666} \cdot \sqrt{1587483826}\right) \\ \frac{1}{5} \cdot \left(\frac{2711}{77} + \frac{8128}{4722666666666666666} \cdot \sqrt{158748382692320940198837660804382}\right) \end{cases}$$

$$z := -4.2359375000000000000 \cdot \text{ft} + .1203125000000000000 \cdot \left(\frac{2711}{77} + \frac{8128}{4722666666666666666} \cdot \sqrt{15874838269232094}\right)$$

$$z = 8.25 \text{ ft}$$

$$D := \frac{1}{5} \cdot \left(\frac{2711}{77} + \frac{8128}{4722666666666666666} \cdot \sqrt{15874838269232094019883766080438271987655395}\right) \cdot \text{ft}$$

$$D = 20.756 \text{ ft}$$

Check:

Available Soil Depth at Pile Location = 55ft +/- Minus 6ft (grade) Minus 15ft (cantilever) = 34ft

Need 21ft Plus 40% = 30ft < 34ft OK

Determine Pt of Zero Shear From Separate Shear Diagram

$$\checkmark \quad x := \frac{P_a}{F_1} \quad x = 7.042 \text{ ft}$$
$$x + Y = 11.52 \text{ ft}$$

Determine M_{\max} And Pile Section Needed:

$$\checkmark \quad M_{\max} := \left[P_a \cdot (x + Y) - F_1 \cdot \frac{x^2}{2} \right] \cdot 6 \text{ ft}$$

NOTE: 6 Foot Pile Spacing

$$M_{\max} = 3.253 \cdot 10^5 \text{ ftlb}$$

$$S_x := M_{\max} \frac{12 \frac{\text{in}}{\text{ft}}}{27500 \text{ psi}}$$

NOTE: Assume 0.55 F_y With 50 ksi Steel

$$S_x = 141.948 \text{ in}^3$$

✓ W 14 X 90 Satisfies Section Requirements, But Use W 14 X 99 To Account For Corrosion, etc.

Lagging

Try 4x12

$$f = \frac{M}{S} = \frac{w l^2}{\frac{b d^2}{6}}$$

where d = depth of beam = $11\frac{1}{2}"$

b = breadth = $3\frac{1}{2}"$

l = 6 ft

$$\text{Then } b = \frac{w l^2}{\frac{f}{6} \times \frac{6}{d^2}} = \frac{6 w l^2}{b d^2 f}$$

for w "now" - no slide - assume 8 ft cantilever piles

$$\text{So: } V_q' = K_a \gamma H = .33 \times 125 \times 8 = 330 \text{ psf}$$

for F_b Reference "Manual for Engineered Wood Const. (MEWC)
 National Design Specification 2001 Ed.

• No 2 Southern Pine 4x12 $\rightarrow F_b = 975 \text{ psi}$

MEWC, Design Values Supplement p. 37

• F_b adjustment factors: MEWC, Design Values Sup.

- Flat use factor (4" breadth) $C_F = 1.1$ p. 36
- Wet service factor $C_M = 0.85$ p. 36
- Size factor $C_F = 1.1$ p. 36
- Load Duration factor $C_D = 0.9$ *

* NDS p. 9

$$\text{So: } F_b = 975 \text{ psi} \times 1.1 \times 0.85 \times 1.1 \times 0.9$$

$$F_b = 900 \text{ psi}$$

$$\therefore b = \frac{6 (330 \text{ psf} \times \frac{11\frac{1}{2} \text{ in}}{12 \text{ in/ft}}) \left(\frac{6 \text{ ft}}{12 \text{ in/ft}} \right)^2 \times 12 \text{ in/ft}}{(11\frac{1}{2} \text{ in})^2 (900 \text{ psi})}$$

$$b = 0.86 \text{ in} < 4" \text{ OK}$$